ACTAAP

Arkansas Comprehensive Testing, Assessment, and Accountability Program

Released Item Booklet

Algebra I End-of-Course Examinations

2010–2011 Administrations

Arkansas Department of Education

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PART I Overview

The criterion-referenced tests implemented as part of the **Arkansas Comprehensive Testing, Assessment, and Accountability Program** (ACTAAP) are being developed in response to Arkansas Legislative Act 35, which requires the State Board of Education to develop a comprehensive testing program that includes assessment of the challenging academic content standards defined by the Arkansas Curriculum Frameworks.

As part of this program, students in Arkansas public schools in 2011 who had completed or were completing Algebra I by the end of first semester participated in the Mid-Year Algebra I End-of-Course Examination. Students in Arkansas public schools who had completed or were completing Algebra I by the end of the spring semester participated in the Spring Algebra I End-of-Course Examination. In addition to the Mid-Year and Spring administrations, a Fall Algebra I End-of-Course Examination and Fall and Spring administrations of the Online Alternative Test for Algebra I were offered for students retesting in Algebra I.

This Released Item Booklet for the Algebra I End-of-Course Examinations contains test questions or items that were asked of students during the 2010–2011 operational administrations. The test items included in Part II of this booklet are some of the items that contributed to the student performance results for these administrations.

Students were given approximately an hour and a half each day to complete assigned test sessions during the two days of Fall and Mid-Year testing. Students were given approximately two hours each day to complete assigned test sessions during the two days of Spring testing. Students were given two hours to complete each of the two sessions for the Online Alternative Test for Algebra I. Students were permitted to use a calculator for both multiple-choice and open-response items. Students were also supplied with a reference sheet to be used so that all students would have equal access to this information during testing. (See the reference sheet on page 72 of this booklet.) All of the multiple-choice items within this booklet have the correct response marked with an asterisk (*****).

The development of the Algebra I End-of-Course Examinations was based on the *Arkansas Algebra I Mathematics Curriculum Framework*. This framework has distinct levels: Strands to be taught in concert, Content Standards within each Strand, and Student Learning Expectations within each Content Standard. An abridged version of the *Arkansas Algebra I Mathematics Curriculum Framework* can be found in Part III of this booklet. It is important to note that this abridged version lists only the predominant Strand, Content Standard, and Student Learning Expectation associated with each item. However, since many key concepts within the *Arkansas Algebra I Mathematics Curriculum Framework* are interrelated, there may be many cases in which there are other item correlations or associations across Strands, Content Standards, and Student Learning Expectations.

Part IV of the Released Item Booklet contains a tabular listing of the Strand, Content Standard, and Student Learning Expectation that each question was designed to assess. The multiple-choice and open-response items found on the Algebra I End-of-Course Examinations were developed in close association with the Arkansas education community. Arkansas teachers participated as members of the Algebra I Content Advisory Committee, providing routine feedback and recommendations for all items. The number of items associated with specific Strands, Content Standards, and Student Learning Expectations was based on approximate proportions suggested by the Content Advisory Committee, and their recommendations were accommodated to the greatest extent possible given the overall test design. Part IV of the Released Item Booklet provides Arkansas educators with specific information on how Algebra I End-of-Course Examination items align or correlate with the *Arkansas Algebra I Mathematics Curriculum Framework* to provide models for classroom instruction.

PART I Scoring Student Responses to Algebra I Open-Response Items

While multiple-choice items are scored by machine to determine if the student chose the correct answer from four options, responses to open-response items must be scored by trained "readers" using a pre-established set of scoring criteria.

The Arkansas Algebra I Rangefinding Committee assisted in the development of the scoring criteria. The committee comprises active Arkansas educators with expertise in mathematics education.

Reader Training

Before readers are allowed to begin assigning scores to any student responses, they go through intensive training. The first step in that training is for the readers to read the Algebra I open-response items as they appear in the test booklet and to respond—just as the student test takers are required to do. This step gives the readers some insight into how the students might have responded. The next step is the readers' introduction to the scoring rubric. All of the specific requirements of the rubric are explained by the Scoring Director who has been specifically trained to lead the scoring group. Then responses (anchor papers) that illustrate the score points of the rubric are presented to the readers and discussed. The goal of this discussion is for the readers to understand why a particular response (or type of response) receives a particular score. After discussion of the rubric and anchor papers, readers practice scoring sets of responses that have been pre-scored and selected for use as training papers. Detailed discussion of the responses and the scores they receive follows.

After three or four of these practice sets, readers are given "qualifying rounds." These are additional sets of pre-scored papers, and, in order to qualify, each reader must score in exact agreement on at least 80% of the responses and have no more than 5% non-adjacent agreement on the responses. Readers who do not score within the required rate of agreement are not allowed to score the Algebra I End-of-Course Examination responses.

Once scoring of the actual student responses begins, readers are monitored constantly throughout the project to ensure that they are scoring according to the criteria. Daily and cumulative statistics are posted and analyzed, and Scoring Directors or Team Leaders reread selected responses scored by the readers. These procedures promote reliable and consistent scoring. Any reader who does not maintain an acceptable level of agreement is dismissed from the project.

Scoring Procedures

All student responses to the Algebra I End-of-Course Examination open-response test items are scored independently by two readers. Those two scores are compared, and responses that receive scores that are non-adjacent (a "1" and a "3," for example) are scored a third time by a Team Leader or the Scoring Director for resolution.

PART II MID-YEAR RELEASED ALGEBRA I ITEMS

1. At the U-Pick Apple Orchard, it costs a flat fee of $3 plus $1.50 per pound to pick apples. What is the total cost if a person picks 7 pounds of apples?

A. $11.50
*B. $13.50
C. $22.50
D. $31.50

2. Which shows the expression $\frac{4}{\sqrt{2}}$ in a **correctly** simplified form?

*A. $2\sqrt{2}$
B. 8
C. $\sqrt{2}$
D. 2

3. What value of x satisfies the equation $\frac{2}{3}x+1=9$?

A. $5\frac{1}{3}$
B. $6\frac{2}{3}$
*C. 12
D. 15

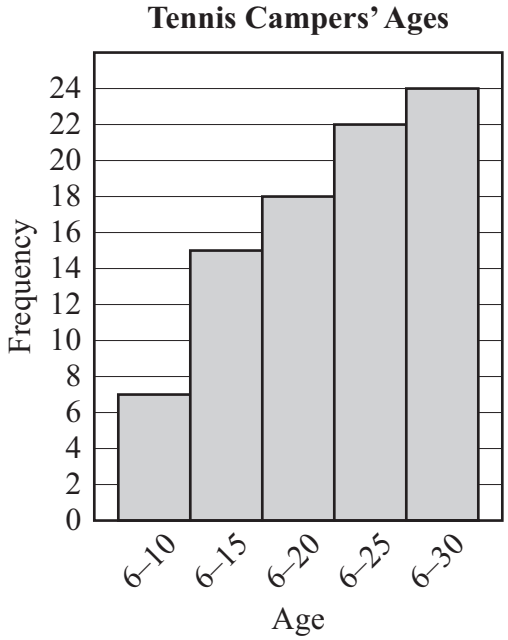
4. A manager of a car dealership records the number of cars sold by each salesperson during each month of the year. In a graph showing the car sales made by Salesperson #1 over the course of a year, which would be the independent variable?

*A. Months
B. Car Types
C. Salespeople
D. Number of Cars Sold

5. Which expression is a factored form of $4x^2-9$?

A. $2(x-3)^2$
B. $(2x-3)^2$
C. $2(x+3)(x-3)$
*D. $(2x+3)(2x-3)$

6. The cumulative frequency histogram below shows the ages of students at a tennis camp.



According to this cumulative frequency histogram, how many students from 16 to 20 years old are at this tennis camp?

*A. 3
B. 8
C. 11
D. 18

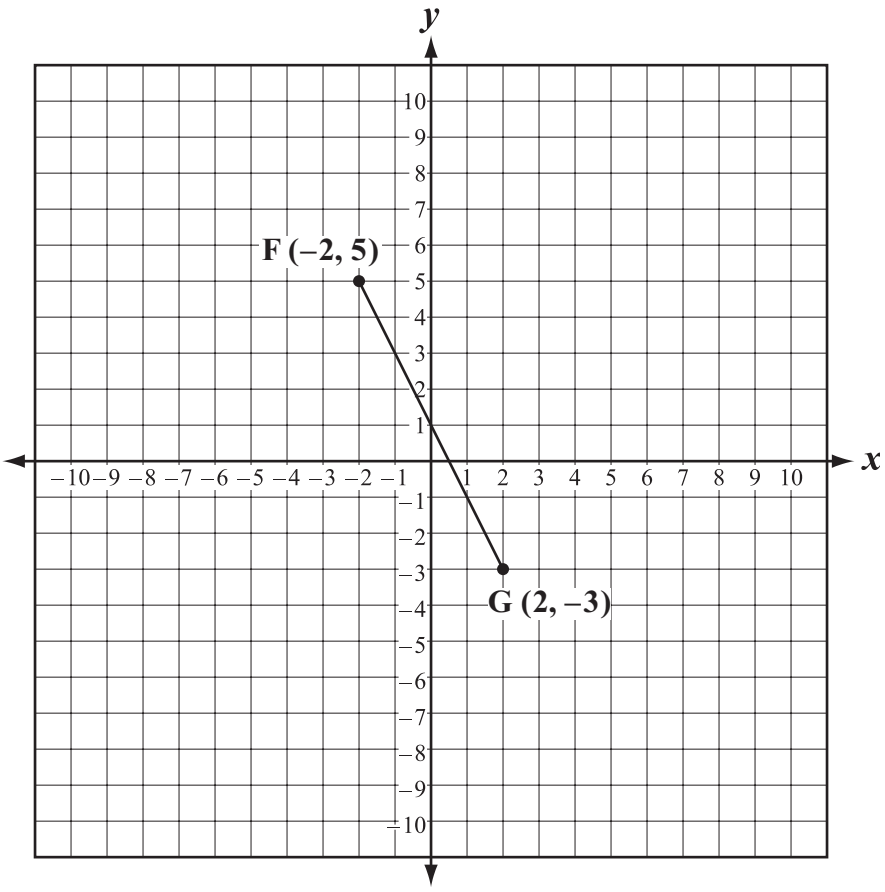
7. The length of a painting is two less than three times the width. If the width of the painting is 15 inches, what is the length in inches?

A. 27
B. 39
*C. 43
D. 47

8. What is the slope of the graph of $y = -\frac{2}{5}x + 3$?

A. -2
*B. $-\frac{2}{5}$
C. $\frac{2}{5}$
D. 3

9. Use the diagram below to answer the question.



What are the coordinates of the midpoint of line segment FG?

A. $(-2, 5)$
B. $(2, -3)$
*C. $(0, 1)$
D. $(0, 2)$

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10. Which is a solution to the equation $x^2 - 3x - 10 = 0$?

A. 2
B. 3
*C. 5
D. 10

11. The circumference of a circle with radius r can be found using the equation $C = 2\pi r$. Which equation **correctly** solves for r in terms of C?

*A. $r = \frac{C}{2\pi}$

B. $r = 2\pi C$

C. $r = C + 2\pi$

D. $r = C - 2\pi$

12. Which expression is undefined when $x = 0$?

A. x

B. x^2

C. $\frac{x}{2}$

*D. $\frac{1}{x}$

13. The height, h, of a soccer ball in feet after it is kicked is given by the equation $h = -8t^2 + 20t$, where t is the time in seconds after the ball has been kicked. According to this equation, how many seconds does it take for the ball to reach the ground ($h = 0$)?

*A. 2.5

B. 3.3

C. 8.0

D. 20.0

14. Use the matrices below to answer the question.

$$A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \\ 5 & 4 \end{bmatrix} \quad B = \begin{bmatrix} -1 & 0 \\ 2 & 1 \\ 3 & 4 \end{bmatrix}$$

Which matrix represents the expression $2B - A$?

A. $\begin{bmatrix} -4 & -6 \\ -2 & 0 \\ -10 & -8 \end{bmatrix}$

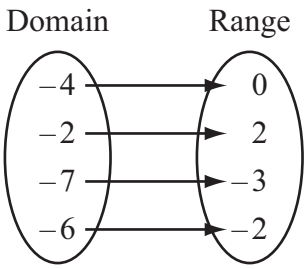
*B. $\begin{bmatrix} -4 & -3 \\ 3 & 2 \\ 1 & 4 \end{bmatrix}$

C. $\begin{bmatrix} -6 & -6 \\ 2 & 2 \\ -4 & 0 \end{bmatrix}$

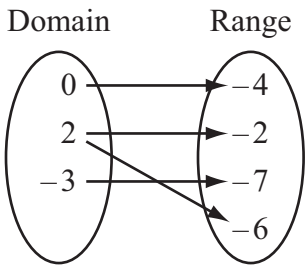
D. $\begin{bmatrix} 5 & 6 \\ 0 & -1 \\ 7 & 4 \end{bmatrix}$

15. Which of the following represents the same function as $(0,-4),\ (2,-2),\ (-3,-7),\ (-2,-6)$?

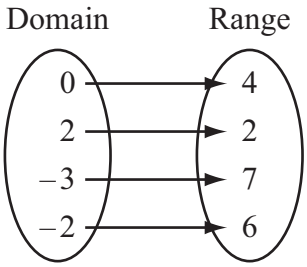
A.



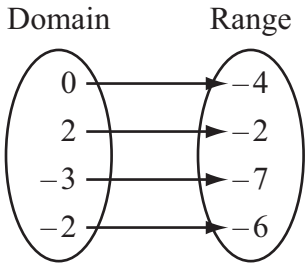
B.



C.



*D.



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16. Susan found the mean of the salaries in the table listed below.

Weekly Salary	$278	$125	$110	$95	$80	$70	$54

What would be the effect on the mean if the highest salary were **not** included in her calculations?

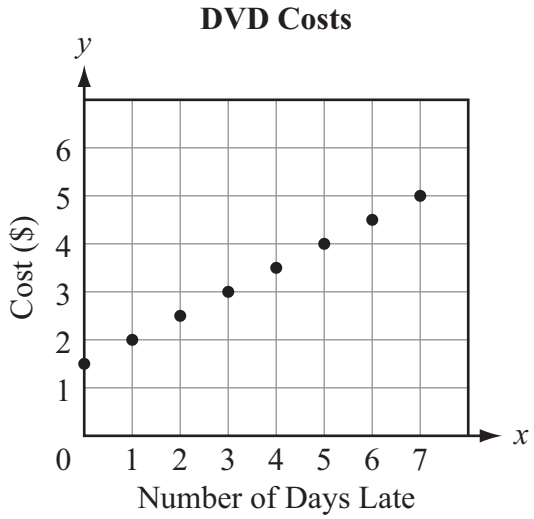
A. The mean would be lower by $278.

*B. The mean would be lower by $27.

C. The mean would be higher by $278.

D. The mean would be higher by $27.

17. Rick rents a DVD from a store that charges a daily late fee for overdue DVDs. The graph shows the total cost of renting a DVD plus the late fee.



What is the amount of the daily late fee?

*A. $0.50
B. $1.50
C. $3.50
D. $5.00

18. What is the value of the expression $4(2y-5)^2$ when $y=-3$?

A. 4
B. 64
*C. 484
D. 842

19. What is the solution to $|x+8|=9$?

*A. $x=1$ or $x=-17$
B. $x=1$ or $x=17$
C. $x=\pm 17$
D. $x=\pm 1$

20. The speed of light is about 3.00×10^8 m/s. What is 45 times the speed of light in **correct** scientific notation?

A. 1.4×10^6 m/s
B. 14×10^8 m/s
C. 14×10^9 m/s
*D. 1.4×10^{10} m/s

21. A bag contains 2 red marbles, 3 green marbles, and 5 blue marbles. Sue randomly selects one marble and then another without replacement. What is the probability that Sue will select a green marble and then a blue marble?

*A. $\frac{1}{6}$
B. $\frac{3}{10}$
C. $\frac{5}{9}$
D. $\frac{3}{20}$

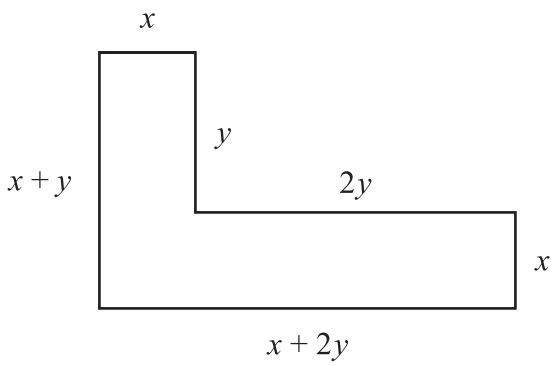
22. Use the table below to answer the following question.

x	*y*
–2	11
–1	8
0	5
1	2
2	–1

Which function is represented by this table?

A. $y = 3x + 5$
B. $y = 3x - 5$
C. $y = -3x - 5$
*D. $y = -3x + 5$

23. Use the figure below to answer the following question.



What is the perimeter of the figure above?

A. $2x + 6y$
B. $4x + 2y$
*C. $4x + 6y$
D. $6x + 4y$

24. The vertex of the graph $f(x) = x^2$ is shifted down three units. What is the equation of this new graph?

A. $f(x) = x^2 + 3$
*B. $f(x) = x^2 - 3$
C. $f(x) = (x + 3)^2$
D. $f(x) = (x - 3)^2$

25. Kim bought a new bicycle on sale for $97. The original price of the bike was $120. Tom receives the same percent discount. Which is closest to the amount Tom will pay for a bicycle with an original price of $170?

A. $68.47
B. $127.94
C. $129.69
*D. $137.42

26. Which pair of equations has graphs that are parallel lines?

*A. $y = 2x + 3$
$y = 2x - 3$

B. $y = 2x + 3$
$y = 4x + 3$

C. $y = 2x + 3$
$y = -2x + 3$

D. $y = 2x + 3$
$y = -\frac{1}{2}x + 3$

27. What are the solutions of the equation $2x^2 + 3x - 20 = 0$?

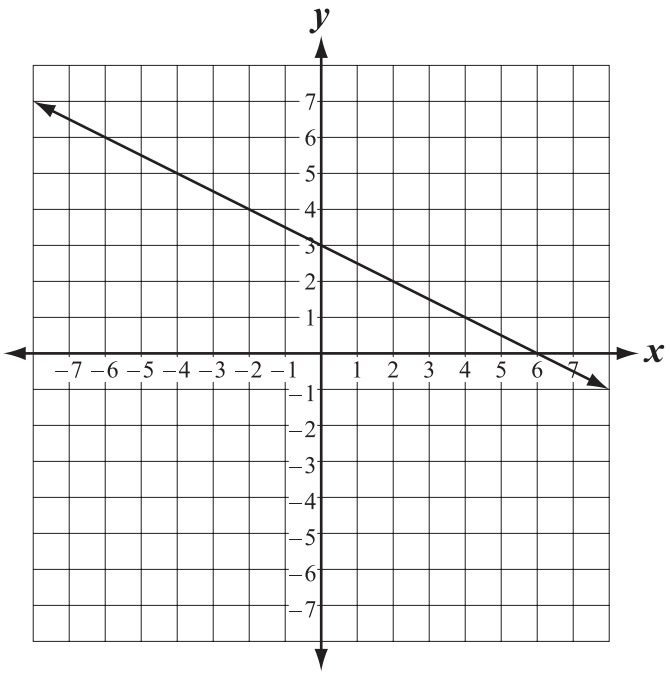
A. $x = -5, 3$

B. $x = -3, 5$

C. $x = 4, -\frac{5}{2}$

*D. $x = -4, \frac{5}{2}$

28. The graph of $f(x)$ is shown below.



What type of graph is shown?

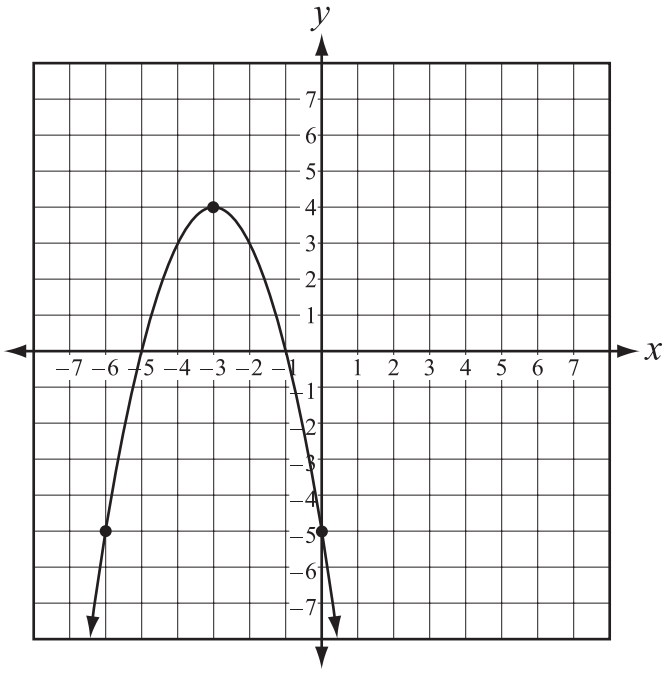
*A. linear

B. inverse

C. quadratic

D. exponential

29. Use the graph below to answer the following question.



What point is the vertex of this graph?

A. (−5, 0)

*B. (−3, 4)

C. (−1, 0)

D. (0, 0)

30. Michael wants to know which game sports fans prefer to watch, basketball or football. From which of the following groups should Michael sample to get the **best** results for his survey?

A. 25 people attending a football game

B. 25 people attending a basketball game

C. 50 people who like to play board games

*D. 50 people who are eating lunch in the cafeteria

PART II Mid-Year Released Algebra I Items

A. The function $h = -16t^2 + 128t$ represents the relationship between the height of an object, h, and the time in the air, t.

1. Copy and complete the following table in your answer document.

t	*h*
0	
1	
4	
7	
8	

2. Sketch a graph of the function on the grid provided for the period $0 \leq t \leq 8$.

3. Label the coordinates of the zeros.

4. For this scenario, what do the x coordinates of the zeros represent?

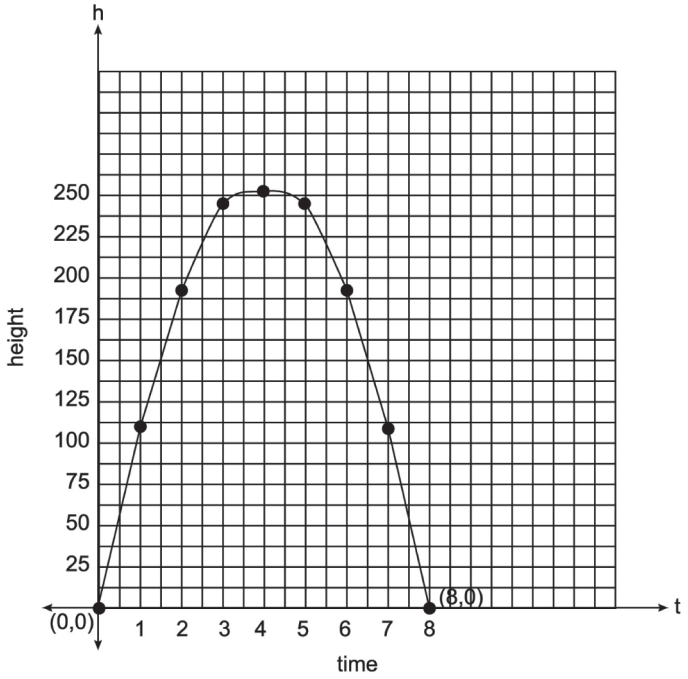
BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

Item A Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 4 points. No incorrect work is included
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

SOLUTION AND SCORING

4 points possible:

<table>
<tr><th>Part</th><th>Points</th></tr>
<tr><td>1</td><td>1 point possible
1 point: Correct and complete table, as shown below:
(5 correct values are listed for h)
<table><tr><th>t</th><th>h</th></tr><tr><td>0</td><td>0</td></tr><tr><td>1</td><td>112</td></tr><tr><td>4</td><td>256</td></tr><tr><td>7</td><td>112</td></tr><tr><td>8</td><td>0</td></tr></table>OR
½ point: 4 correct values are listed for h</td></tr>
<tr><td>2</td><td>1 point possible
1 point: Correct graph as shown below:
• All points plotted correctly
• Curve is drawn containing all points plotted for $0 \le t \le 8$
• Axes are labeled t and h, time and height, or equivalent
• Intervals are consistent on both axes
 
</td></tr>
</table>

Part	Points
2	**1 point possible (continued)** **OR** ½ point: Everything is correct on the graph except the points are NOT connected or Graph contains one or two errors Ex: Axes not labeled Ex: Axes are reversed (not a function) Ex: One point plotted incorrectly and inconsistent interval on *h*-axis Ex: Segments are drawn containing plotted points rather than a curve Ex: Inconsistent intervals on both *h* and *t* axes Ex: Arrows on parabola or graph includes points for which $t < 0$ or $t > 8$ **Note: No credit for graph of a straight line**
3	**1 point possible** 1 point: Correct zeros: (0, 0) and (8, 0) are named or are identified on the graph or Correct zeros based on an incorrect graph of a quadratic equation in Part 2 or Correct zeros based on table in Part 1
4	**1 point possible** 1 point: Correct explanation Give credit for the for the following or equivalent: • The *x* coordinates of the zeros represent the times when the object is on the ground • The first zero is when the object is about to go up and the second zero is the time it hits the ground. **OR** ½ point: • Correct explanation for one of the zeros: Ex: "It's when the object hits the ground." Ex: "It's before the object goes up." or • Vague explanation Ex: "The time to take to get a height of zero."

B. Ray charges $25 to mow a lawn plus $10 per hour to weed gardens.

1. Mr. Ortega wants to have his lawn mowed and his garden weeded. Copy the table below in your answer document. Fill in the table and show the total cost that Mr. Ortega would have to pay Ray for each of the times listed.

Ray's Costs

Hours of Weeding	Total Cost in dollars (lawn and garden)
0	
1	
2	
3	

2. Write an equation that represents how much it will cost, C, for Ray to mow a lawn and do h hours of weeding.

3. Write an inequality that shows how many hours of weeding Mr. Ortega can receive if he wants to spend no more than $82.

4. Solve the inequality you wrote in Part 3 to find how many full hours Mr. Ortega can receive. Show your work or explain your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

Item B Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 4 points. No incorrect work is included
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

SOLUTION AND SCORING

4 points possible:

<table>
<tr><th>Part</th><th>Points</th></tr>
<tr><td>1</td><td>1 point possible
1 point: Correct and complete table, as shown below:
(4 correct values are listed for Total Cost)

Ray's Costs
<table><tr><th>Hours of Weeding</th><th>Total Cost in dollars (lawn and garden)</th></tr><tr><td>0</td><td>$25</td></tr><tr><td>1</td><td>$35</td></tr><tr><td>2</td><td>$45</td></tr><tr><td>3</td><td>$55</td></tr></table>
OR
½ point: 3 correct values are listed for Total Cost
or
3 correct values are listed for Total Cost based on an incorrect non-zero cost given for 0 hours of weeding.

Note for Parts 2 and 3: Other variables may be used at any level if defined. If not defined this becomes a 3/4 issue.</td></tr>
<tr><td>2</td><td>1 point possible
1 point: Correct equation: $C = 25 + 10h$ (or equivalent)

OR
½ point: Correct expression: $25 + 10h$</td></tr>
<tr><td>3</td><td>1 point possible
1 point: Correct inequality: $25 + 10h \leq 82$ (or equivalent)
(or correct inequality based on an incorrect equation in Part 2)
or
$10h \leq 82$ (or equivalent)
(Based on the wording in Part 3 this prompt could be read to mean weed only)</td></tr>
</table>

Part	Points
4	**1 point possible** 1 point: Correct # of hours: 5 (accept 5.7 or 5 hours, 42 minutes) (or correct # based on incorrect inequality in Part 3) Correct procedure shown or explained • $25 + 10h \leq 82$ $10h \leq 57$ $h \leq 5.7$ → So he can get 5 full hours. • Correct guess and check procedure: $10(5) + 25 = \$75$ $10(6) + 27 = \$85$ (Shows that 5 hours works and 6 hours does not) • $82 - 25 = 57$ $57 \div 10 = 5.7$ So 5 is the number of full hours • Continues Part 1 table to 6 hours with correct answer of 5 **OR** ½ point: • Correct # of hours: 5 (accept 5.7 or 5 hours, 42 minutes) Procedure is incomplete or missing or • # of hours is incorrect due to a calculation, copy or rounding error Correct procedure is shown or explained or • Correctly solves $25 + 10h \geq 82$ with an answer of 5, 5.7 or 5 hours, 42 minutes

PART II Spring Released Algebra I Items

1. For which table is the relationship shown a function of y in terms of x?

A.

x	y
–4	11
–2	7
0	5
–2	–3

*B.

x	y
–3	5
–2	7
–1	9
0	11

C.

x	y
3	–7
3	–9
3	0
3	3

D.

x	y
4	5
3	–7
0	6
4	–3

2. Weight varies directly with gravity. An astronaut with all her gear would weigh only 55 pounds on the moon but 330 pounds on Earth. If another astronaut would weigh 62 pounds on the moon, what is his weight on Earth? Round your answer to the nearest tenth of a pound.

A. 186.3 pounds

B. 292.7 pounds

C. 337.0 pounds

*D. 372.0 pounds

3. If $g(x) = 5x - 4$, what is $g(-2)$?

*A. -14

B. -6

C. 6

D. 14

4. A student wants to design a survey that will help him decide whether the people in his neighborhood will participate in a newspaper recycling program. Which survey plan describes the **best** sampling method to use?

A. He should interview members of his family.

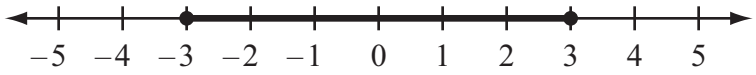
B. He should interview every student in his math class.

C. He should interview members of the local ecology club.

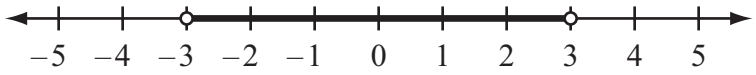
*D. He should interview three families on each street in his area.

5. Which graph shows the values of x in the inequality $|x| < 3$?

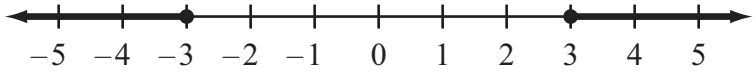
A.



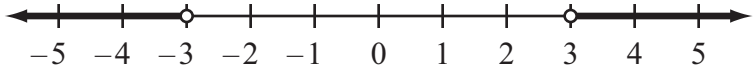
*B.



C.



D.



6. What is the greatest common factor of the polynomial $3x^3y + 15xy^2 - 6x^2y^2$?

*A. $3xy$
B. $3x^3y$
C. $3x^2y^2$
D. $6x^2y^2$

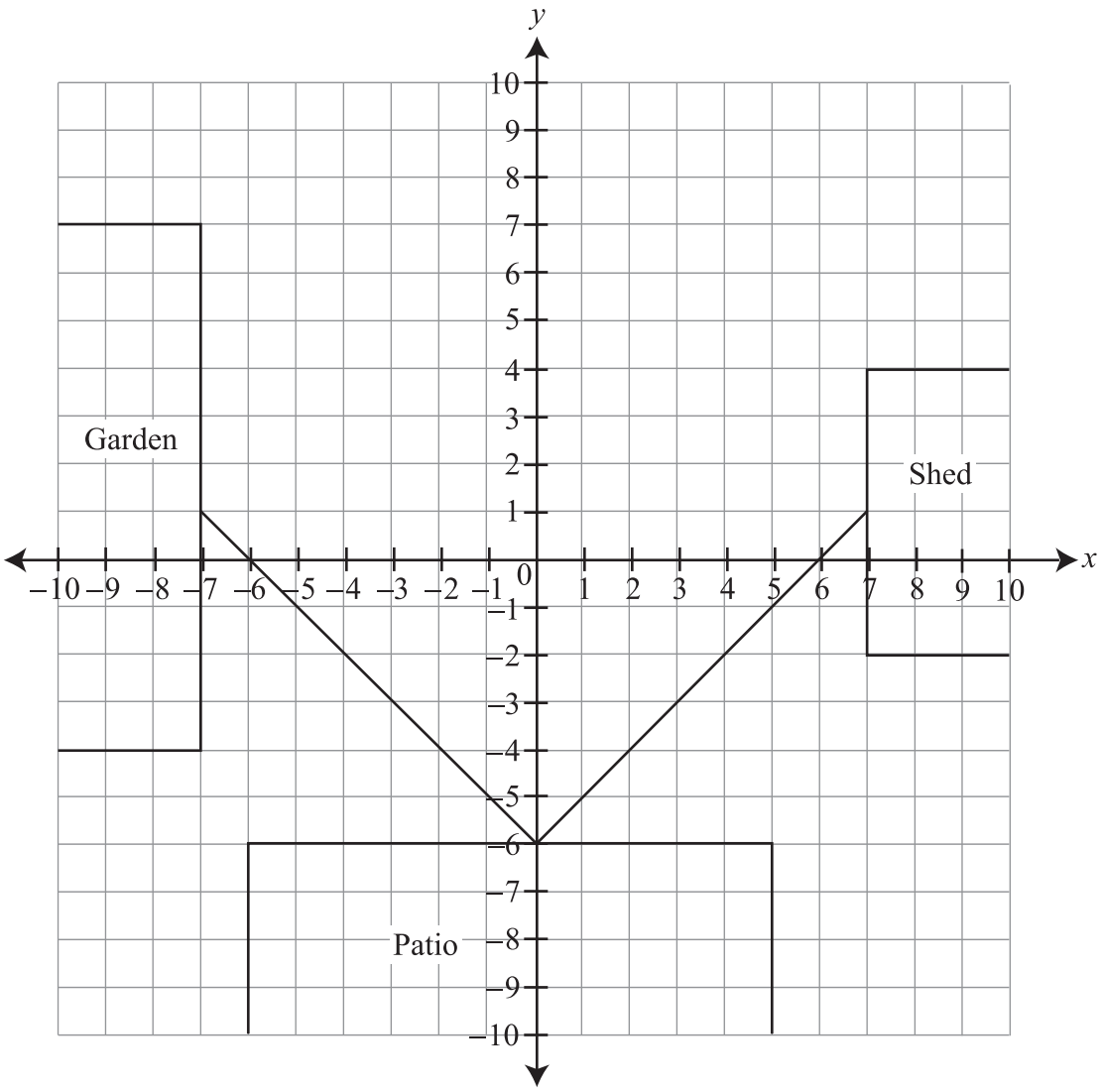
7. What is the value of $2(x + 4y) - 5y$ for $x = -1$ and $y = 2$?

A. -4
B. 1
*C. 4
D. 5

8. Which expression is equivalent to $4x^2(2x^3 - 5x + 6)$?

*A. $8x^5 - 20x^3 + 24x^2$
B. $8x^6 - 5x^2 + 24x^2$
C. $8x^5 - x^3 + 24x^2$
D. $6x^5 - x^3 + 10x^2$

9. Henry graphed a map of his backyard on a coordinate grid, with the origin representing the middle of the backyard. He plans to install two cement walkways from his patio, one going to the garden and one going to the shed.



Which equation could represent the two walkways?

A. $y = x - 6$

B. $y = -x - 6$

C. $y = |x - 6|$

*D. $y = |x| - 6$

10. Jamal collects data about golfers. He records the number of years they have played and their **best** score. Jamal's data is graphed below.

Jamal draws the line of **best** fit through the points to predict the trend. According to the line, which is a likely best score for a golfer who has played for 2 years?

A. 80

B. 85

*C. 91

D. 95

---

11. The equation $N = (1 + i)B$ is used to calculate the balance of a savings account at the end of each month. Which of the following shows this equation solved for the variable i?

A. $i = \frac{N}{B}$

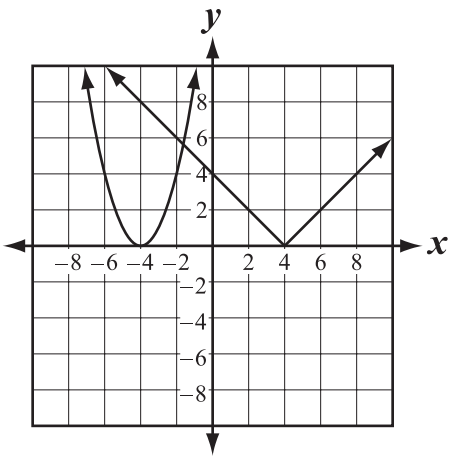
B. $i = \frac{N}{2B}$

C. $i = \frac{N}{B} + 1$

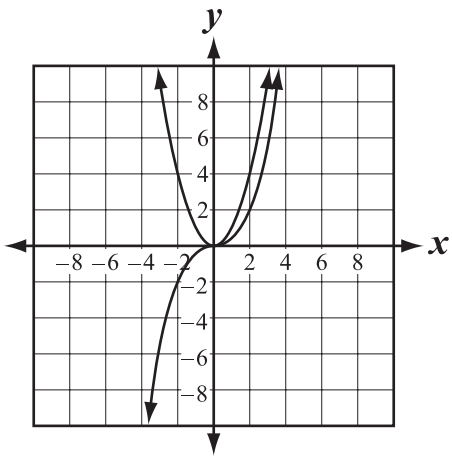
*D. $i = \frac{N}{B} - 1$

12. Which graph shows two functions in the same family?

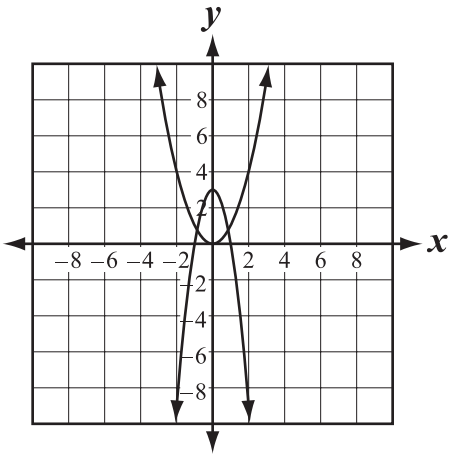
A.



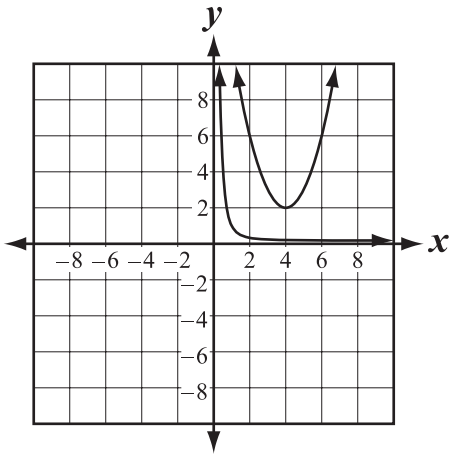
B.



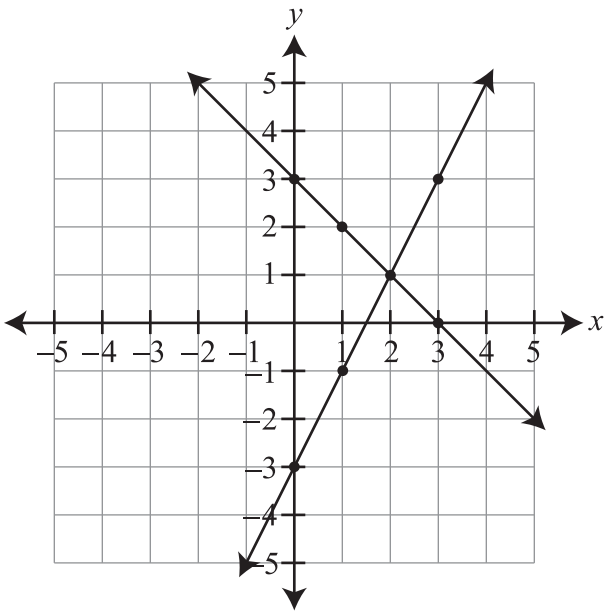
*C.



D.



13. Equations $3 = y + x$ and $y = 2x - 3$ are graphed below.



Which ordered pair is the solution of this system of equations?

A. (1, 2)
B. (3, 0)
*C. (2, 1)
D. (0, 3)

14. What is the value of $(3.5 \times 10^{18})(8.0 \times 10^{-7})$?

A. 2.8×10^{11}
*B. 2.8×10^{12}
C. 2.8×10^{-124}
D. 2.8×10^{-125}

15. Kelly plays a board game. Each time it is her turn she rolls a number cube numbered one through six. On her first turn she rolls a 4. What is the probability Kelly will roll a 3 on her second turn?

A. $\frac{1}{36}$
*B. $\frac{1}{6}$
C. $\frac{1}{5}$
D. $\frac{1}{2}$

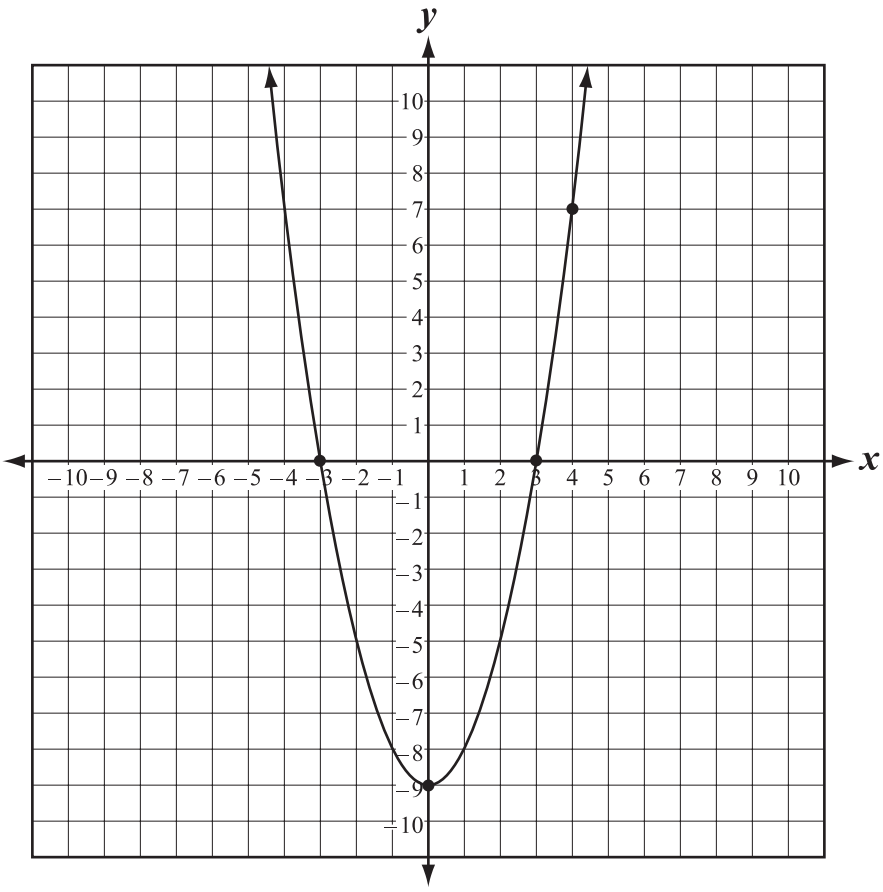
16. What are the solutions to $x^2 + 3x - 10 = 0$?

A. $x = 10$ or $x = -1$
B. $x = 3$ or $x = -10$
*C. $x = -5$ or $x = 2$
D. $x = -7$ or $x = 7$

17. What is the slope of the line containing the points $(-1, 6)$ and $(3, -5)$?

*A. $-\frac{11}{4}$
B. $-\frac{4}{11}$
C. $-\frac{7}{8}$
D. $-\frac{8}{7}$

18. The function $f(x)$ is graphed below.



What is the minimum of $f(x)$?

*A. −9
B. −3
C. 3
D. 9

19. Use the table below to answer the following question.

x	–2	–1	0	1	2	3
$f(x)$	–10	–7	–4	–1	2	5

Which equation is represented by the data in this table?

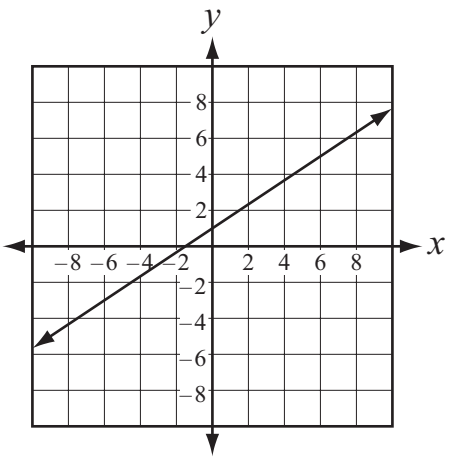
A. $f(x) = x + 3$

B. $f(x) = x - 8$

*C. $f(x) = 3x - 4$

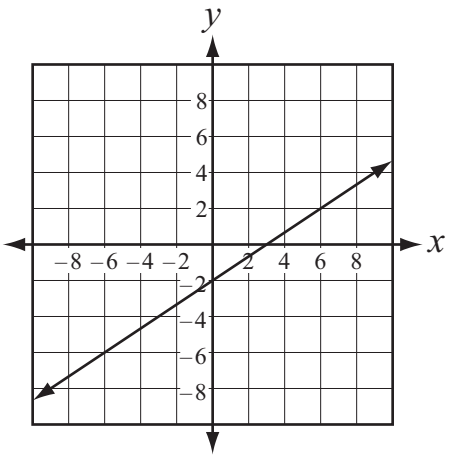
D. $f(x) = 6x + 2$

20. Use the graph below to answer the following question.

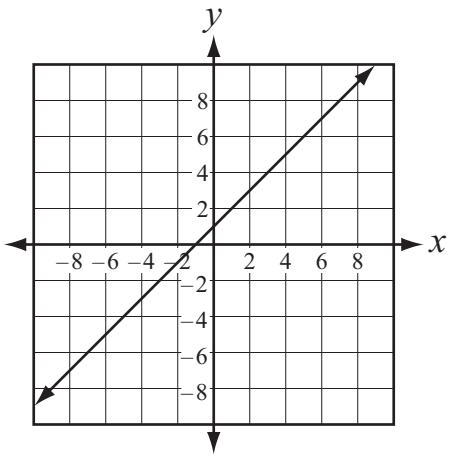


Which of the following has a greater y-intercept than the graph shown above?

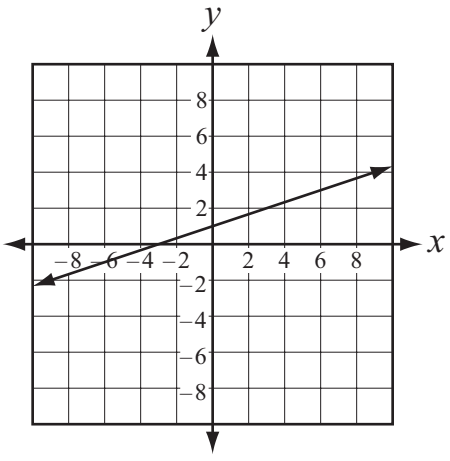
A.



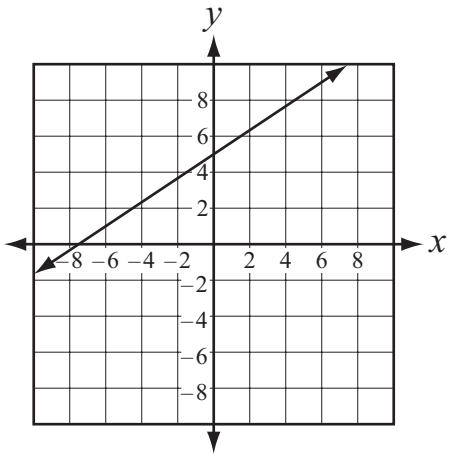
B.



C.

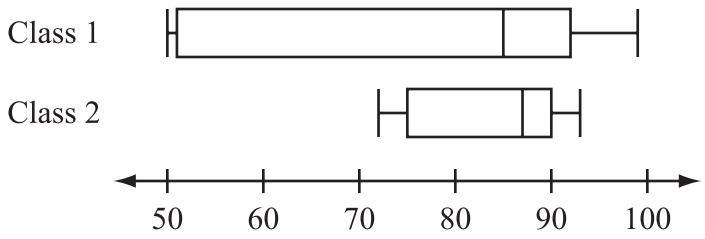


*D.



21. The number of homework assignments completed by students in two classes is represented in the plot below.

Number of Completed Homework Assignments



Which statement **correctly** compares the data from Class 1 and Class 2?

*A. The range for Class 2 is less than the range for Class 1.
B. The mean for Class 1 is less than the mean for Class 2.
C. The mode for Class 1 is greater than the mode for Class 2.
D. The median for Class 1 is greater than the median for Class 2.

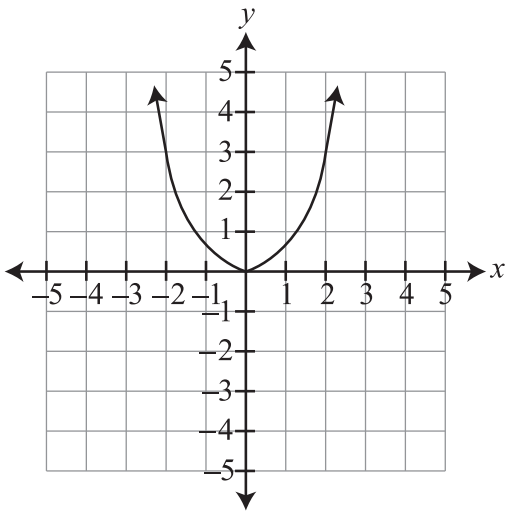
22. Two less than 4 times a number is 22. Which equation represents this situation, where n is the number?

A. $2-4n=22$
B. $(2-4)n=22$
C. $4(n-2)=22$
*D. $4n-2=22$

23. The total number of boxes packed (t) can be found using the equation $t = 25x + 30$ where x is the number of workers packing boxes. What is the independent variable in this equation?

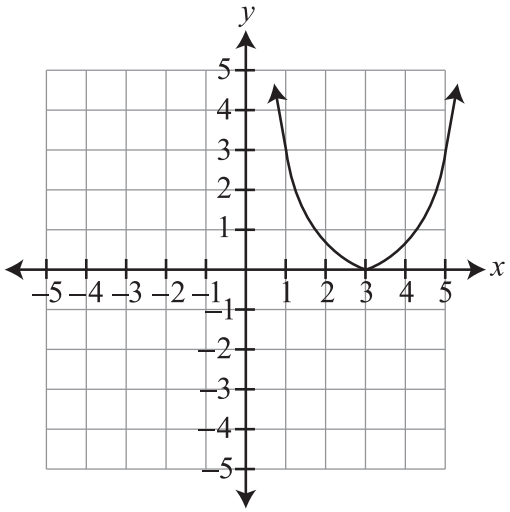
A. t
*B. x
C. 25
D. 30

24. The graph of a function is shown below.

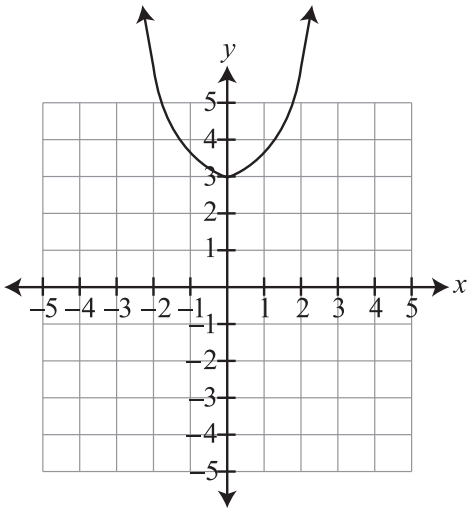


Which is the image of the graph after a vertical shift of –3?

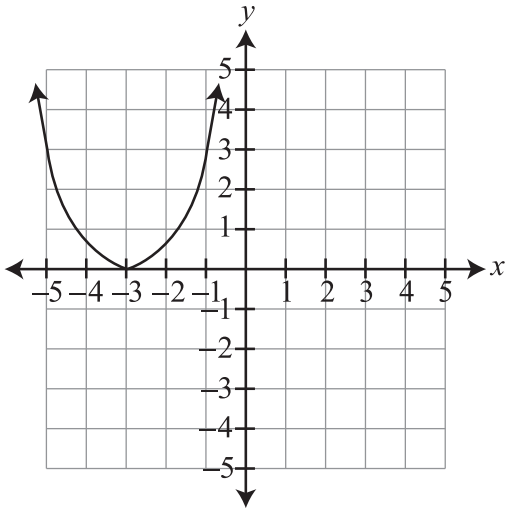
A.



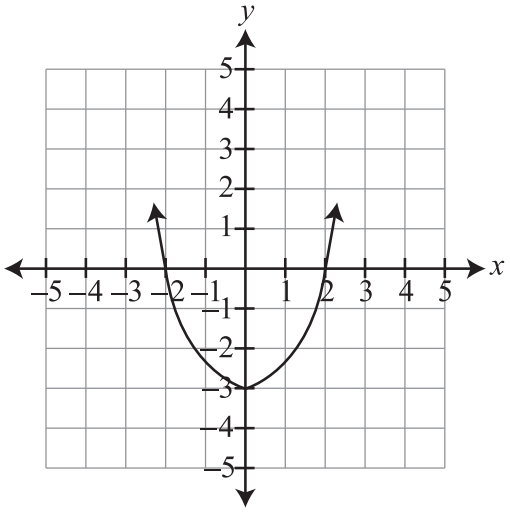
B.



C.



*D.



25. Jeanette's Drive-In sells soft drinks and coffee in three sizes: regular, large, and jumbo. The table below shows how many of each beverage and size were sold last night.

	Regular	**Large**	**Jumbo**
Soft Drinks	20	23	18
Coffee	5	13	4

Which matrix represents this information?

A. $\begin{matrix} S \\ C \end{matrix}\begin{bmatrix} 61 \\ 22 \end{bmatrix}$

B. $\begin{matrix} R & L & J \end{matrix}$
$\begin{bmatrix} 25 & 36 & 22 \end{bmatrix}$

C. $\begin{matrix} & R & L & J \\ S & & & \\ C & & & \end{matrix}\begin{bmatrix} 20 & 5 & 23 \\ 13 & 18 & 4 \end{bmatrix}$

*D. $\begin{matrix} & R & L & J \\ S & & & \\ C & & & \end{matrix}\begin{bmatrix} 20 & 23 & 18 \\ 5 & 13 & 4 \end{bmatrix}$

26. An art teacher uses 18% of his yearly budget on supplies for the first project. If he spends $216 on supplies for the first project, what is the teacher's yearly budget?

*A. $1200

B. $1800

C. $2592

D. $3888

27. Assuming no denominator equals 0, which shows the expression below in completely simplified form?

$$\frac{18x^2z^5 + 30x^3z^4}{2xz^4}$$

A. $9z + 15x^2$

*B. $9xz + 15x^2$

C. $12xz + 20x^2$

D. $\dfrac{6xz^2(3xz^3 + 5x^2z^2)}{2xz^4}$

28. What value of x satisfies the equation $\frac{2}{3}x + \frac{1}{4} = 6$?

A. $x = \frac{3}{8}$

B. $x = \frac{17}{2}$

*C. $x = \frac{69}{8}$

D. $x = \frac{71}{2}$

29. Which expression is equivalent to $4\sqrt{10} \bullet 3\sqrt{7}$?

A. $12 + 3\sqrt{10} + 4\sqrt{7} + \sqrt{70}$

*B. $12\sqrt{70}$

C. $60\sqrt{7}$

D. 840

30. How are the slopes of parallel lines related?

*A. They are equal.

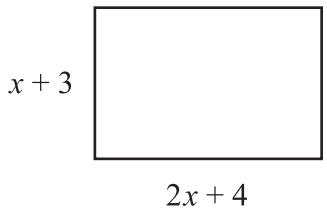
B. They are opposites of each other.

C. They are reciprocals of each other.

D. They are opposite reciprocals of each other.

PART II Spring Released Algebra I Items

A. Use the rectangle below to answer the following questions.



1. Find the perimeter of the rectangle shown above in terms of x. Simplify your answer. Show your work.

2. If each side is doubled, what is the new perimeter of this rectangle in terms of x? Simplify your answer. Show your work.

3. Find the area of the original rectangle shown above in terms of x. Simplify your answer. Show your work.

4. If each side is doubled, what is the new area of this rectangle in terms of x? Simplify your answer. Show your work.

BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

Item A Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 4 points. The response contains no incorrect work.
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

SOLUTION AND SCORING

4 points possible:

Part	Points
1	**1 point possible** 1 point: Correct perimeter: $6x+14$ Correct procedure shown and/or explained Give credit for the following or equivalent: • P = $2(x+3)+2(2x+4)$ = $2x+6+4x+8$ (not required) = $6x+14$ • Figure is drawn, all 4 sides labeled correctly with answer of $6x + 14$ **OR** ½ point: • Correct perimeter: $6x+14$ Work is incomplete or missing or • Perimeter is correct but is not in simplest form Correct procedure is shown and/or explained or • Perimeter is incorrect due to 1 calculation or copy error Correct procedure is shown and/or explained
2	**1 point possible** 1 point: Correct new perimeter: $12x+28$ (or correct perimeter, simplified, based on an incorrect perimeter in Part 1) Correct procedure shown and/or explained Give credit for the following or equivalent: • P = $2(6x+14)$ = $12x+28$ • P = $2\left[2(2x+4)+2(x+3)\right]$ = $2\left[4x+8+2x+6\right]$ = $2\left[6x+14\right]$ = $12x+28$ • Figure is drawn, all 4 sides labeled correctly with answer of $12x+28$ • Figure is drawn, all 4 sides labeled correctly in Part 1 and 2 non-adjacent sides labeled correctly in Part 2 with answer of $12x+28$ **OR** ½ point: • Correct new perimeter: $12x+28$ Work is incomplete or missing or • Perimeter is correct but is not in simplest form Correct procedure is shown and/or explained or • Perimeter is incorrect due to 1 calculation or copy error Correct procedure is shown and/or explained

Part	Points
3	**1 point possible** 1 point: Correct area: $2x^2+10x+12$ Correct procedure shown and/or explained Give credit for the following or equivalent: • A = $(2x+4)(x+3)$ = $2x^2+6x+4x+12$ (not required) = $2x^2+10x+12$ **OR** ½ point: • Correct area: $2x^2+10x+12$ Work is incomplete or missing or • Area is correct but is not in simplest form Correct procedure is shown and/or explained or • Area is incorrect due to 1 calculation or copy error Correct procedure is shown and/or explained
4	**1 point possible** 1 point: Correct new area: $8x^2+40x+48$ Correct procedure shown and/or explained Give credit for the following or equivalent: • A = $(4x+8)(2x+6)$ = $8x^2+24x+16x+48$ (not required) = $8x^2+40x+48$ • Quadruples Part 3 area **OR** ½ point: • Correct new area: $8x^2+40x+48$ Work is incomplete or missing or • Area is correct but is not in simplest form Correct procedure is shown and/or explained or • Area is incorrect due to 1 calculation or copy error Correct procedure is shown and/or explained

B. The table below shows the number of flowers that a store has in stock and the number of flowers that have been ordered by customers.

Flowers in Stock and Ordered

Flower	In Stock (dozens)	Customer Orders (dozens)
Red rose	45	30
Yellow rose	20	16
Red carnation	23	25
Yellow carnation	12	8

1. Create two matrices, one representing the flowers in stock and one representing the flowers that customers have ordered. Be sure to use all correct labels.

2. Create a new matrix representing the difference between the flowers in stock and the flowers that customers have ordered. Show your work.

3. Using the matrix created in Part 2, determine whether or not all the orders can be filled. List which, if any, orders that cannot be filled. Explain your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

Item B Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 4 points. No incorrect work is included
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

PART II SPRING RELEASED ALGEBRA I ITEMS

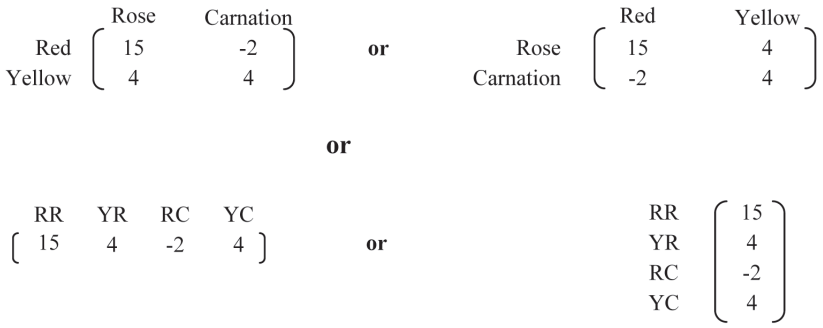
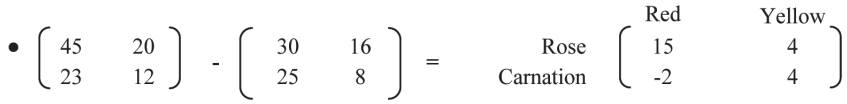
SOLUTION AND SCORING

4 points possible:

Note: Full credit may be given if labels on rows and columns are interchanged and numbers are located in the correct corresponding position.

Part	Points
1	**2 points possible** 2 points: 2 correct and complete matrices, as shown below: Flowers in Stock (not required) $\begin{array}{c} \\ \text{Red} \\ \text{Yellow} \end{array}\begin{array}{c}\begin{array}{cc}\text{Rose} & \text{Carnation}\end{array}\\ \begin{pmatrix} 45 & 23 \\ 20 & 12 \end{pmatrix}\end{array}$ **or** $\begin{array}{c} \\ \text{Rose} \\ \text{Carnation} \end{array}\begin{array}{c}\begin{array}{cc}\text{Red} & \text{Yellow}\end{array}\\ \begin{pmatrix} 45 & 20 \\ 23 & 12 \end{pmatrix}\end{array}$ **or** $\begin{array}{c}\begin{array}{cccc}\text{RR} & \text{YR} & \text{RC} & \text{YC}\end{array}\\ \begin{pmatrix} 45 & 20 & 23 & 12 \end{pmatrix}\end{array}$ **or** $\begin{array}{c} \\ \text{RR} \\ \text{YR} \\ \text{RC} \\ \text{YC} \end{array}\begin{array}{c}\\ \begin{pmatrix} 45 \\ 20 \\ 23 \\ 12 \end{pmatrix}\end{array}$ Customer Orders (not required) $\begin{array}{c} \\ \text{Red} \\ \text{Yellow} \end{array}\begin{array}{c}\begin{array}{cc}\text{Rose} & \text{Carnation}\end{array}\\ \begin{pmatrix} 30 & 25 \\ 16 & 8 \end{pmatrix}\end{array}$ **or** $\begin{array}{c} \\ \text{Rose} \\ \text{Carnation} \end{array}\begin{array}{c}\begin{array}{cc}\text{Red} & \text{Yellow}\end{array}\\ \begin{pmatrix} 30 & 16 \\ 25 & 8 \end{pmatrix}\end{array}$ **or** $\begin{array}{c}\begin{array}{cccc}\text{RR} & \text{YR} & \text{RC} & \text{YC}\end{array}\\ \begin{pmatrix} 30 & 16 & 25 & 8 \end{pmatrix}\end{array}$ **or** $\begin{array}{c} \\ \text{RR} \\ \text{YR} \\ \text{RC} \\ \text{YC} \end{array}\begin{array}{c}\\ \begin{pmatrix} 30 \\ 16 \\ 25 \\ 8 \end{pmatrix}\end{array}$ **OR** 1 point: • 7 entries are correct Correct labels are included and are properly placed **or** • All 8 entries are correct Labels are incomplete or missing

PART II SPRING RELEASED ALGEBRA I ITEMS

Part	Points
2	**1 point possible** 1 point: Correct and complete matrix as shown below: (or correct matrix based on incorrect answer(s) in Part 1)  **or** **or** Correct procedure shown or explained Give credit for the following or equivalent: • $45-30=15$ $\quad 23-25=-2$ $20-16=4$ $\quad 12-8=4$ •  •  **OR** ½ point: • 4 entries are correct Labels are correct and complete Procedure is incomplete or missing or • 3 entries are correctly placed and labeled 1 entry is incorrect due to a calculation or copy error Procedure is shown or explained or • 4 entries are correct Procedure is correct and complete Labels are incomplete or missing

Part	Points
3	**1 point possible** 1 point: Correct answer and explanation (or correct answer and explanation based on an incorrect matrix in Part 2) Give credit for the following or equivalent: • "No, the store does not have enough flowers to fill the orders. The negative number (-2) means they don't have enough red carnations." **OR** ½ point: Answer is missing but explanation would support the correct answer. Ex: "Well the matrix has -2 dozen red carnations." Ex: "There's a negative number in the matrix." or Answer is correct but explantion is vague or contains some misstatement. Ex: "No because they're 2 red carnations short."

C. A tiling contractor charges a $150.00 set-up fee and $20.00 per square foot of tile installation.

1. Write an equation that he could use to determine the price to charge his customers if a is the number of square feet to be tiled and C is the cost.

2. Copy the table below into your answer document. Complete the table.

Cost of Tiling

Square Footage (a)	Cost (C)
10	
20	
30	
40	
50	

3. On the grid provided in your answer document, graph the y-intercept and one other coordinate pair. Draw a straight line through the points. Be sure to label your axes and give a title to your graph.

4. Explain changes to the slope and y-intercept, if any, if the contractor raised the price per square foot to be tiled.

BE SURE TO LABEL YOUR RESPONSES 1, 2, 3, AND 4.

Item C Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 4 points. Graph in Part 3 is titled No incorrect work is included
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points or some minimal understanding is shown. Ex: Equation in Part 1 which would be correct if different variables were defined
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

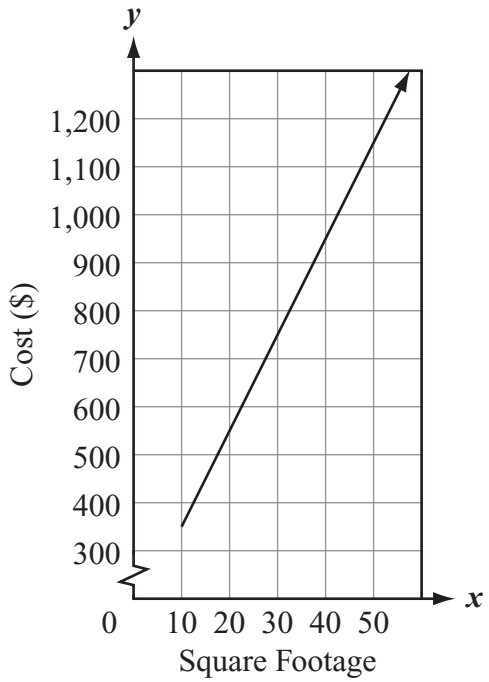
SOLUTION AND SCORING

4 points possible:

<table>
<tr><th>Part</th><th>Points</th></tr>
<tr><td>1</td><td>1 point possible
1 point: Correct equation: $C = 150 + 20a$
Note: Different variables may be used if defined.

OR
½ point: Correct expression: $150 + 20a$
or
Correct equation with variables which have not been defined</td></tr>
<tr><td>2</td><td>1 point possible
1 point: Correct and complete table, as shown below:
(5 correct values are listed for C)

Cost of Tiling
<table><tr><th>Square Footage (a)</th><th>Cost (C)</th></tr><tr><td>10</td><td>$350</td></tr><tr><td>20</td><td>$550</td></tr><tr><td>30</td><td>$750</td></tr><tr><td>40</td><td>$950</td></tr><tr><td>50</td><td>$1,150</td></tr></table>OR
½ point: 4 correct values are listed for C
or
Work contains one calculation error made at any point. Subsequent values are correct based on error.
Note: Do not give credit if first value is $200.</td></tr>
</table>

Part	Points
3	**1 point possible** 1 point: Correct graph, as shown below: **Note: Title of graph is required for a "4".** **Cost of Tiling Job based on Square Footage**  Graph must contain: *y*-intercept plotted correctly one other coordinate pair plotted correctly consistent intervals on both axes both axes labeled line, ray, or segment is drawn **OR** ½ point: One or two errors Ex: Inconsistent intervals on both axes Title missing and axes unlabeled **Note: Consider missing labels on one or both axes to be one error** **Consider inconsistent interval on either axis to be one error** **If both axes have inconsistent intervals that is two errors** **Title is a 3 / 4 issue**

Part	Points
4	**1 point possible** 1 point: Correct explanation Give credit for the following or equivalent: • "Slope will be steeper if the price per square foot were increased." **Note: The response may include the fact that the *y*-intercept will not change, but this statement is not required. If statement regarding *y*-intercept is made it must be correct or no credit is awarded.**

PART II Retest Released Algebra I Items

1. The city of Mumbai, India, had the largest urban population in the world in 2001. The estimated population was 11,900,000. What is this population expressed in scientific notation?

A. 1.19×10^{-7}

*B. 1.19×10^{7}

C. 119×10^{2}

D. $11{,}900 \times 10^{2}$

2. Jack's Ticket Booth sells tickets for various sporting events. The number of tickets Jack sells varies indirectly with the price at which he sells them. He sells 2,000 tickets when he charges $20.00 per ticket. How many tickets will Jack sell when he charges $10.00 per ticket?

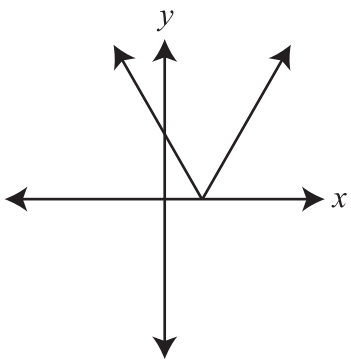
A. 1,000

B. 2,010

C. 3,000

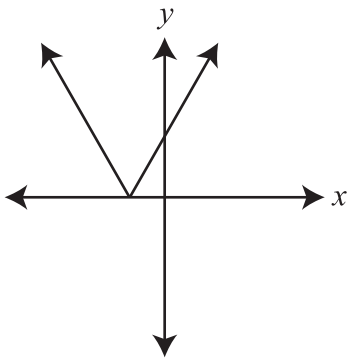
*D. 4,000

3. The graph of a function is shown below.

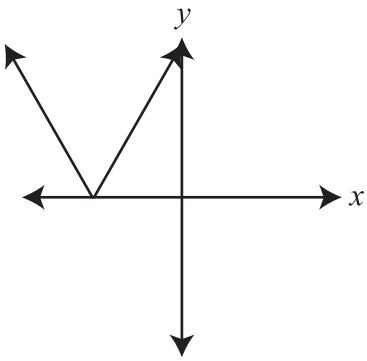


Which is the image of the graph after a reflection over the *x*-axis?

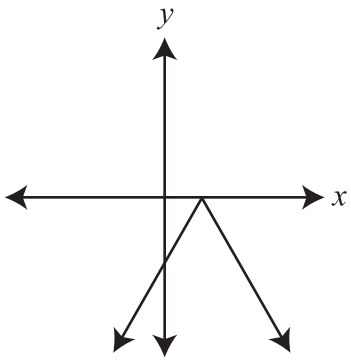
A.



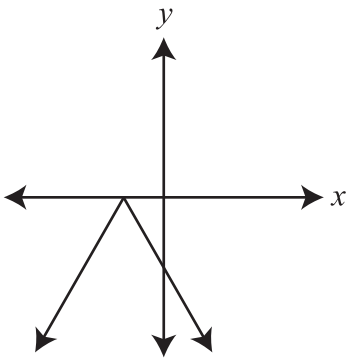
B.



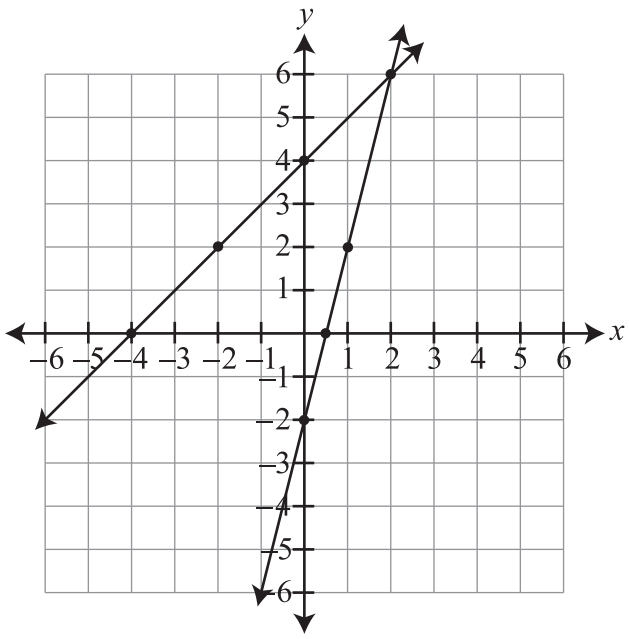
*C.



D.



4. What ordered pair is the solution to the system of equations graphed below?



A. (0, –2)

B. (–4, 0)

*C. (2, 6)

D. (1, 2)

5. Which describes the effect on a graph when the equation $y = -\frac{1}{2}x - 2$ is changed to $y = -\frac{1}{2}x + 2$?

*A. The line moves upward on the *y*-axis.

B. The line moves downward on the *y*-axis.

C. The line moves to the right on the *x*-axis.

D. The line slants upward, from left to right, instead of downward.

6. What value(s) of *x* would make the expression below undefined?

$$\frac{x^2 - 3x - 10}{x^2 - 10x + 25}$$

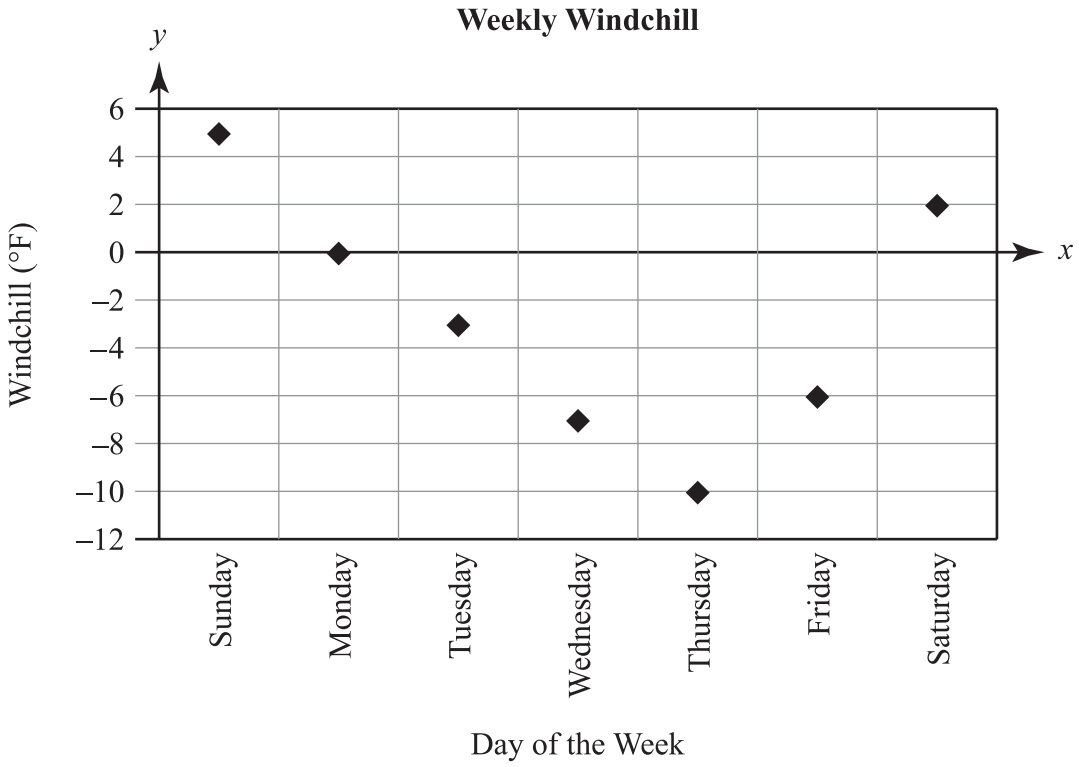
*A. $x = 5$

B. $x = -5$

C. $x = -2$ and $x = 5$

D. $x = 13$ and $x = 12$

7. Suzan recorded the windchill for a week in January, as shown in the graph below.



What day shows the zero of the graph?

A. Sunday
*B. Monday
C. Thursday
D. Saturday

8. A line has an x-intercept of 2 and a y-intercept of -4. What is the equation of the line, in standard form?

*A. $2x - y = 4$

B. $4x - y = 2$

C. $2x - 2y = 4$

D. $-2x + y = 2$

9. Matrices A and B are shown below.

$$A = \begin{bmatrix} 5 & 0 & 11 \\ -2 & 3 & 2\frac{1}{2} \\ 0 & 5\frac{1}{2} & 7 \end{bmatrix} \qquad B = \begin{bmatrix} 3 & 2 & 7 \\ -5 & -2\frac{1}{2} & 0 \\ 4\frac{1}{3} & -5\frac{1}{2} & -7 \end{bmatrix}$$

Which matrix represents $A + B$?

A. $\begin{bmatrix} 15 & 0 & 77 \\ 10 & -7\frac{1}{2} & 0 \\ 0 & 30\frac{1}{4} & -49 \end{bmatrix}$

*B. $\begin{bmatrix} 8 & 2 & 18 \\ -7 & \frac{1}{2} & 2\frac{1}{2} \\ 4\frac{1}{3} & 0 & 0 \end{bmatrix}$

C. $\begin{bmatrix} 8 & 2 & 18 \\ 7 & -5\frac{1}{2} & 2\frac{1}{2} \\ 4\frac{1}{2} & -11 & -14 \end{bmatrix}$

D. $\begin{bmatrix} 8 & 2 & 18 \\ 7 & -5\frac{1}{2} & 2\frac{1}{2} \\ 4\frac{1}{2} & 0 & 0 \end{bmatrix}$

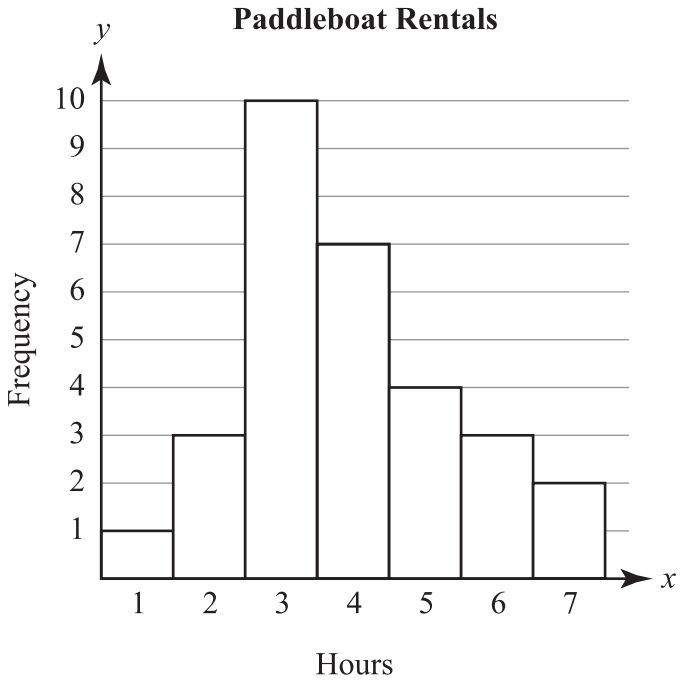
10. Which is equivalent to the expression $3\sqrt{5} + 2\sqrt{20}$?

*A. $7\sqrt{5}$
B. $7\sqrt{10}$
C. $11\sqrt{5}$
D. 25

11. Which is a completely factored form of the expression $x^2 + 21x + 20$?

A. $(x + 5)(x + 4)$
B. $(x + 10)(x + 2)$
*C. $(x + 20)(x + 1)$
D. $(x + 21)(x - 1)$

12. Maria manages a paddleboat rental shop. She recorded the number of hours that each of 30 customers rented paddleboats. The frequency of the customers' hourly usage is recorded below.



Which statement **best** describes the data?

*A. The mode of the data is 3 hours.
B. The range of the data is 10 hours.
C. Seven customers rented paddleboats for 2 hours each.
D. Fewer customers rented a paddleboat for 5 hours than for 6 hours.

13. Which is the simplest form of the expression $\sqrt{\frac{48}{12}}$?

A. $\frac{4\sqrt{2}}{2\sqrt{2}}$

B. $4\sqrt{12}$

C. 4

*D. 2

14. Francisco has test scores of 82, 92, 89, and 93. He has one test left, and his goal is to have a test score mean of 90. What is the minimum score he must achieve on the final test in order to meet his goal?

A. 98

*B. 94

C. 90

D. 89

15. If $8 = \frac{5}{4}x - 2$, what is the value of x?

A. 4.8

*B. 8

C. 12

D. 12.5

16. A function is completely defined by the table below.

x	y
1	3
0	6
–1	2
10	–1

What are the domain and the range of the function?

A. Domain = {10}; Range = {6}

B. Domain = {11}; Range = {7}

C. Domain = {–1, 10}; Range = {–1, 6}

*D. Domain = {–1, 0, 1, 10};
Range = {–1, 2, 3, 6}

17. Julio's Rental Cars charges $100 plus an additional $0.20 per mile traveled. What is the rate of change of this linear cost function?

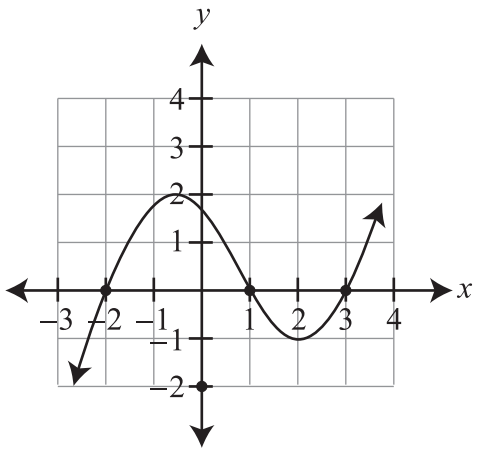
A. 0.002 dollars per mile

*B. 0.20 dollars per mile

C. 100 dollars per mile

D. 500 dollars per mile

18. Which points represent the zeros of the function graphed below?



A. (−1, 0), (−2, 0), (3, 0)

B. (−1, 0), (2, 0), (3, 0)

*C. (1, 0), (−2, 0), (3, 0)

D. (1, 0), (2, 0), (−3, 0)

19. What are the solutions to $-36 = -16x^2$?

A. $x = -16$, or $x = -36$

B. $x = -8$, or $x = -16$

*C. $x = \frac{3}{2}$, or $x = -\frac{3}{2}$

D. $x = 4$, or $x = 6$

20. Which table represents y as a function of x?

*A.

Weight (x)	Cost (y)
0–15	$ 6.95
16–30	$ 9.95
31–60	$13.95

B.

Weight (x)	Cost (y)
0–10	$ 6.95
5–12	$ 9.95
7–15	$13.95

C.

Weight (x)	Cost (y)
0–10	$ 6.95
5–20	$13.95
3–60	$16.95

D.

Weight (x)	Cost (y)
0–20	$ 6.95
10–35	$ 9.95
15–31	$24.95

21. John is selling pizzas to earn money to go on a band trip. Each pizza costs $10. He sold pizzas to 5 of his friends. The table below shows his sales.

Friend	Number of Pizzas Sold	Cost of Pizzas
1	1	$ 10
2	2	$ 20
3	3	$ 30
4	4	$ 40
5	5	$ 50
Total	15	$150

Which would be the recursive formula for the cost of the pizza?

*A. $a_x = a_{x-1} + 10$

B. $a_x = a_{x-1} - 10$

C. $a_x = a_{x-1} + 1$

D. $a_x = a_{x-1} - 1$

22. What is the simplest form of the expression $\frac{12b^5}{4b^4}$?

A. $3b^9$

B. $8b$

*C. $3b$

D. 3

23. Mark charges x dollars per hour to mow lawns. He mowed for 7 hours on Saturday and 4 hours on Sunday. Mrs. Hughes gave Mark a $10 tip for doing a great job. Which expression represents the amount of money Mark earned?

A. 11

B. $4x + 10$

*C. $11x + 10$

D. $11(x + 10)$

24. Ms. Allen gives out prizes in her third-grade class every week. She has 26 tiles in a bag, one for each letter of the alphabet. She draws a tile, and everyone whose name begins with that letter gets a prize. Timmy is a student in Ms. Allen's class. What is the probability that Timmy wins a prize during the next drawing?

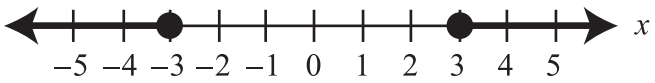
*A. $\frac{1}{26}$

B. $\frac{2}{13}$

C. $\frac{2}{11}$

D. $\frac{5}{26}$

25. Which inequality has a solution set represented by the graph below?



A. $|x| > 3$

*B. $|x| \geq 3$

C. $|x| \leq 3$

D. $|x| < 3$

26. Simplify the expression below.

$$\frac{24m^2}{34mw}$$

A. $\frac{24m}{34w}$

*B. $\frac{12m}{17w}$

C. $\frac{12m^3}{17w}$

D. $\frac{2m}{3w}$

27. If $f(x) = -\frac{2}{3}x + 10$, what is the value of $f(6)$?

A. –2

B. 4

*C. 6

D. 14

28. The owner's manual for a pool states that the number of hours (h) to fill the pool depends on the diameter (d) of the pipe filling the pool. Bradley can determine the time it will take to fill his pool using the equation below.

$$h(d) = \frac{64}{d^2}$$

Which statement correctly describes this equation?

*A. As the diameter of the pipe increases, the time to fill the pool decreases.

B. As the diameter of the pipe increases, the time to fill the pool increases.

C. The minimal time to fill the pool is 64 hours.

D. The maximum time to fill the pool is 64 hours.

29. What is the length of a line segment with end points located at (–3, –5) and (3, 3)?

A. 2

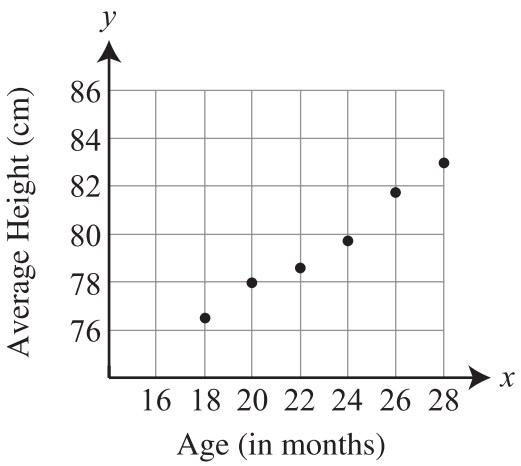
*B. 10

C. 14

D. 100

30. The scatterplot below shows the average heights of Egyptian children with respect to their ages.

Heights of Egyptian Children



Which statement is true based on the data?

A. Height and age are not correlated.

B. Height is the independent variable.

*C. Height and age have a positive correlation.

D. Height and age have a negative correlation.

31. Which pair of functions, when graphed, are parallel lines?

A. $f(x) = 3x + 1$
$g(x) = -3x - 1$

*B. $f(x) = 3x + 1$
$g(x) = 3x - 1$

C. $f(x) = 3x + 1$
$g(x) = \frac{1}{3}x - 1$

D. $f(x) = 3x + 1$
$g(x) = -\frac{1}{3}x - 1$

32. Which is a completely factored form of the expression $4x^2 - 49$?

*A. $(2x + 7)(2x - 7)$

B. $(2x - 7)(2x - 7)$

C. $2(x + 7)(x - 7)$

D. $2(x - 7)(x - 7)$

33. Gravity and weight vary directly. The United States is in a very early stage of planning a manned mission to Mars. An astronaut with all her equipment weighs 260 pounds on Earth but only 100 pounds on Mars. Another astronaut and his equipment weigh 300 pounds on Earth. What would his weight be on Mars? Round your answer to the nearest tenth of a pound.

A. 86.7 pounds
*B. 115.4 pounds
C. 230.8 pounds
D. 780.0 pounds

34. Doug mows lawns and trims bushes. He charges $25 per lawn, plus $5 per bush. Which expression can be used to find the total amount Doug will charge to mow a lawn and trim *b* bushes?

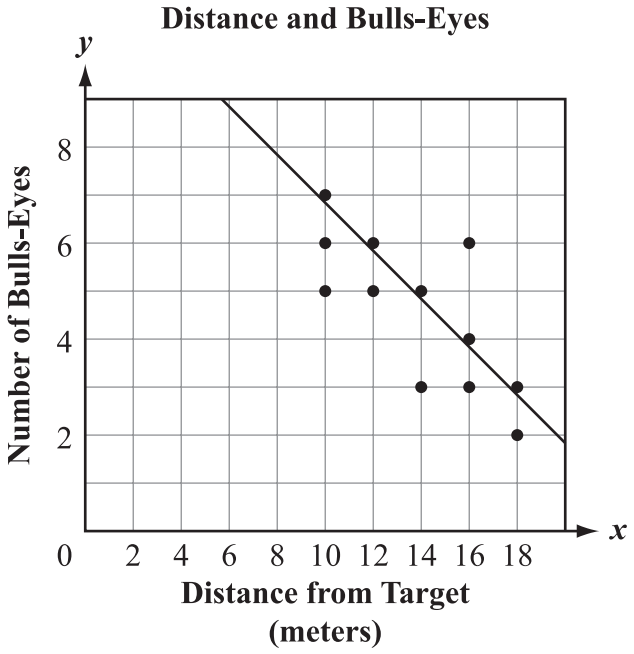
*A. $5b + 25$
B. $25b + 5$
C. $5(b + 25)$
D. $b(5 + 25)$

35. Justin's age is 3 years less than 2 times Mark's age.

Which equation shows the relationship between Justin's age, *j,* and Mark's age, *m*?

*A. $j = 2m - 3$
B. $j = 3m - 2$
C. $j = \frac{m+3}{2}$
D. $j = \frac{m+2}{3}$

36. The scatter plot below shows the number of bulls-eyes made during archery practice.



Based on the line of best fit, which is the **best** prediction of the number of bulls-eyes made when standing 8 meters from the target?

A. 4
B. 6
*C. 8
D. 10

37. People leaving an apple stand were asked how many apples they had purchased and how much money they had spent. The following function was generated from the data collected.

$$f(x) = 25x$$

The cost of an apple is 25 cents. What is the independent variable, x, and the dependent variable, $f(x)$, in this function?

A. independent variable: number of people asked, dependent variable: number of apples purchased
B. independent variable: number of people asked, dependent variable: total money spent on apples
C. independent variable: total money spent on apples, dependent variable: number of apples purchased
*D. independent variable: number of apples purchased, dependent variable: total money spent on apples

38. What is the sum of $(3x-2)$ and $(5x^2+3x)$?

A. $5x^2-2$
*B. $5x^2+6x-2$
C. $8x^2+3x-2$
D. $15x^3-10x^2+3x$

39. Which relationship is an example of causation?

*A. As rainfall increases, river levels rise.

B. As leaves change color, more people wear jackets.

C. As corn ripens, students spend less time doing homework.

D. As daytime temperatures drop, lights are turned on earlier in the day.

40. Which expression is equivalent to $\frac{8xy^2}{24x^2y}$ for $x \neq 0$, $y \neq 0$?

A. $\frac{1}{3}$

*B. $\frac{y}{3x}$

C. $\frac{y^2}{3x}$

D. $\frac{x}{3y}$

41. The blackboard in Mrs. Gonzalez's classroom has an area represented by the expression $x^2 - 5x - 24$. The product of which binomials represents the area of the blackboard?

*A. $(x+3)(x-8)$

B. $(x-3)(x+8)$

C. $(x+6)(x-4)$

D. $(x-6)(x+4)$

42. Which ordered pair is the solution to the system of equations below?

$$\begin{cases} 3x - 7y = -10 \\ 5x - y = -6 \end{cases}$$

A. $\left(-1, -\frac{13}{7}\right)$

B. $\left(0, \frac{10}{7}\right)$

*C. $(-1, 1)$

D. $(1, -1)$

43. For $f(x) = -2x + 7$, what is $f(-1)$?

A. –9
B. –5
C. 6
*D. 9

44. If a car is traveling at a rate of r miles per hour, the distance, in feet, that a car takes to stop after the brakes are applied is given by the expression $r + \frac{r^2}{20}$. If a car is traveling 40 miles per hour, what is the distance, in feet, that it will take to stop after the brakes are applied?

A. 44 feet
B. 80 feet
*C. 120 feet
D. 1,764 feet

45. What are the coordinates of the midpoint of the line segment with endpoints (0, 2) and (4, 6)?

A. (1, 1)
B. (1, 5)
C. (2, 2)
*D. (2, 4)

46. What are the solutions of $x^2 - 2x - 8 = 0$?

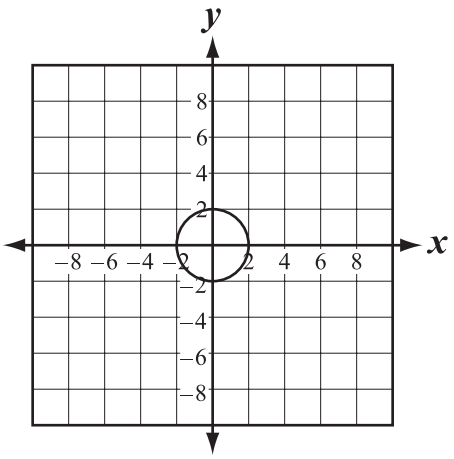
A. $x = -8, 0$
B. $x = -4, 2$
*C. $x = -2, 4$
D. $x = 0, 8$

47. In a certain city, the tax on a $25,000 car is $400. At this rate, what is the tax on a $35,000 car?

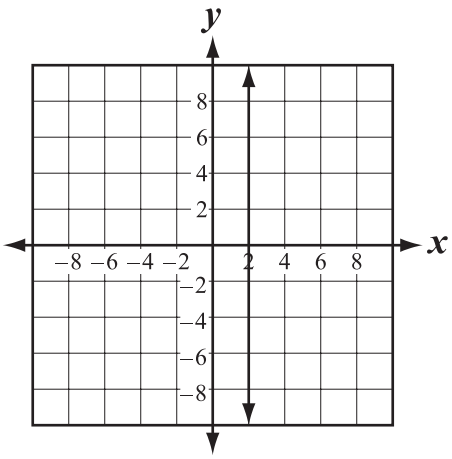
*A. $ 560
B. $ 685
C. $1,000
D. $1,400

48. Which graph represents a function?

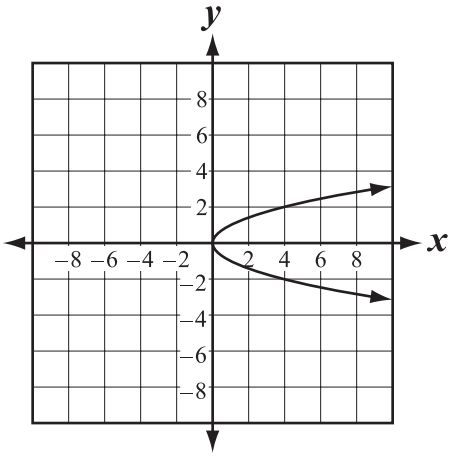
A.



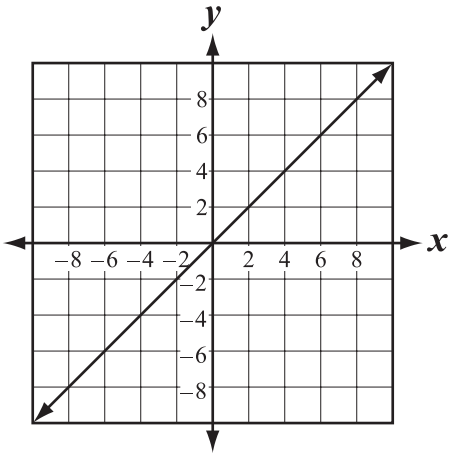
B.



C.



*D.



49. Consider the expression below.

$$\left(\frac{-1}{3x^4y^7}\right)^3$$

Which is an equivalent form of this expression?

*A. $\frac{-1}{27x^{12}y^{21}}$

B. $\frac{1}{27x^{12}y^{21}}$

C. $\frac{-1}{9x^7y^{10}}$

D. $\frac{1}{9x^7y^{10}}$

50. Which function has a graph that is a translation of $f(x) = x^2$ three units up?

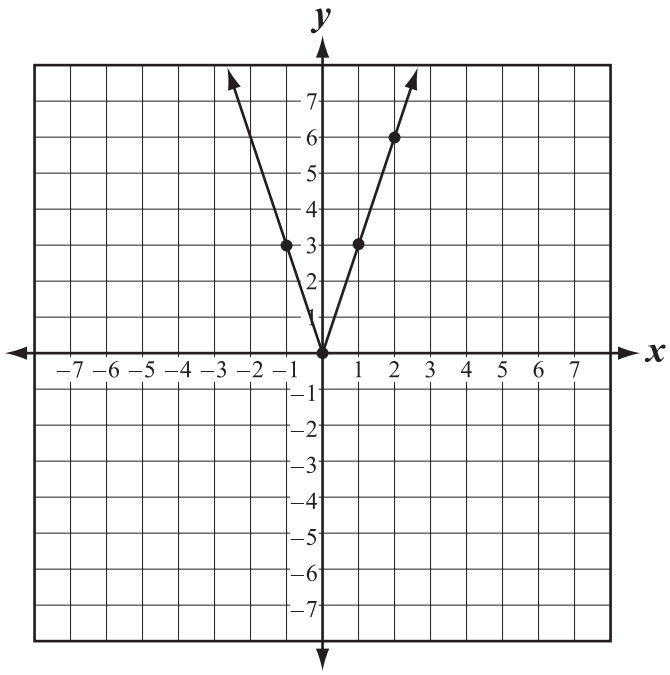
A. $f(x) = x^2 - 3$

*B. $f(x) = x^2 + 3$

C. $f(x) = 3x^2$

D. $f(x) = \frac{1}{3}x^2$

51. Use the graph below to answer the question.



Which set includes numbers that are in the range of this relation?

*A. {0, 3, 6}

B. {0, −3, 6}

C. {−3, 3, 6}

D. {−6, −3, 3}

52. Andrew starts a savings account by depositing $100. Beginning with the first week, each week he adds $10 to his account. Not counting any interest earned, how much money will Andrew have saved at the end of one year?

A. $ 152
B. $ 220
*C. $ 620
D. $5,720

53. The graph of which equation passes through the points (2, 3) and (–4, 0)?

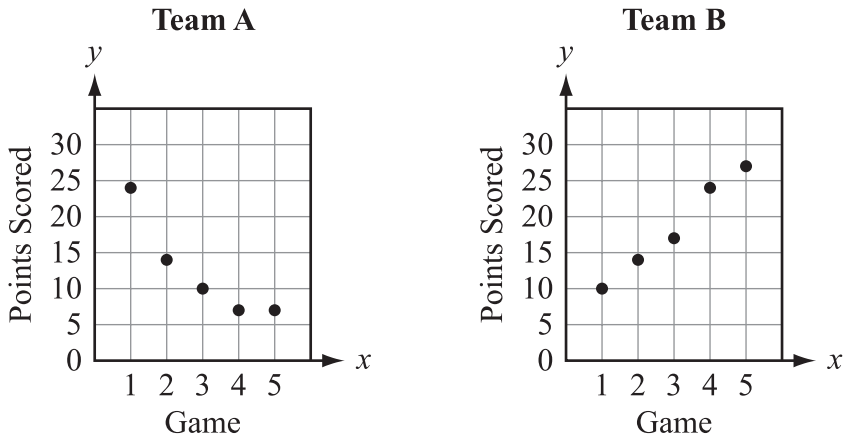
A. $y = \frac{1}{2}x$

B. $y = 2x$

*C. $y = \frac{1}{2}x + 2$

D. $y = 2x - 1$

54. Use the following scatter plots to answer the question.



Which comparison is supported by the data shown in the graphs?

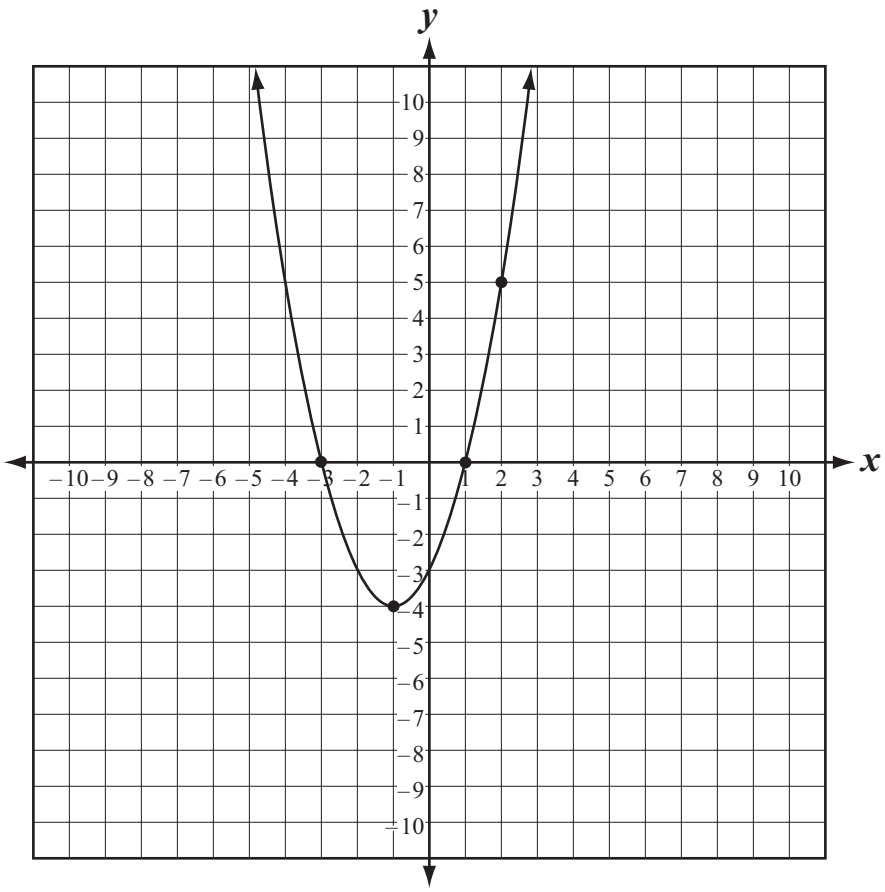
A. Both Team A and Team B increased the number of points scored over time.

B. Both Team A and Team B failed to increase the number of points scored over time.

C. Team A improved the points scored over time and Team B did not improve the points scored over time.

*D. Team B improved the points scored over time and Team A did not improve the points scored over time.

55. The function $f(x)$ is graphed below.



What are the coordinates of the vertex of $f(x)$?

A. $(-3, 0)$

*B. $(-1, -4)$

C. $(0, -3)$

D. $(1, 0)$

56. The kinetic energy (K) of a moving object can be found using the equation below, where m is the object's mass and v is the object's speed.

$$K = \frac{mv^2}{2}$$

Which shows this equation solved for m in terms of K and v?

A. $m = \frac{K}{2v^2}$

B. $m = \frac{v^2}{2K}$

*C. $m = \frac{2K}{v^2}$

D. $m = \frac{2v^2}{K}$

57. What is the value of the expression $(\sqrt{3})(\sqrt{12})$?

A. $\sqrt{6}$

B. $2\sqrt{3}$

*C. 6

D. 18

58. Which of the following is the factored form of the expression $3x^2 - 4x$?

*A. $x(3x-4)$

B. $x(3-4x)$

C. $(3x-1)(x-1)$

D. $(3x+1)(x-1)$

59. Chad needs to make a triangular pennant that has a total area of 14 square inches. He has a piece of felt that is 7 inches long. If the 7-inch side is used as the base of the triangle, what will be the height in inches?

A. $\frac{1}{4}$

B. 1

C. 2

*D. 4

60. Use the data shown below to answer the following question.

Data Table

x	*y*
–2	–8
–1	–5
0	–2
1	1
2	4

What type of relationship is represented in the table?

*A. linear

B. inverse

C. quadratic

D. exponential

PART II RETEST RELEASED ALGEBRA I ITEMS

A. A polynomial expression is given below.

$$2x^2 + 2x - 24$$

1. Factor out the greatest common factor (GCF) of the expression.

2. Continue factoring, and state the complete factorization of the expression.

3. Change the expression to $2x^2 - 2x - 24$. Showing all the steps, completely factor the new expression.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

Item A Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 4 points. Response contains no incorrect work
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point or some minimal understanding shown. Ex: Dividing by 2 in Part 1 and/or Part 3 with correct factoring of remaining trinomial. Ex: Correct but incomplete factorization in Part 2
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

SOLUTION AND SCORING

Part	Points
1	**1 point possible** 1 point: Correct answer**:** **$2(x^2 + x - 12)$**
2	**1 point possible** 1 point: Correct factorization: **$2(x + 4)(x - 3)$** **Note: Factors may be written in any order or they may be a correct factorization of a quadratic expression given in Part 1.**
3	**2 points possible** 1 point: Correct 1st step in factoring: Give credit for the following: • $2(x^2 - x - 12)$ or $(2x + 6)(x - 4)$ or $(2x - 8)(x + 3)$ **AND** 1 point: Correct factorization: **$2(x + 3)(x - 4)$** **Note: Factors may be written in any order.**

B. At noon, a pump started emptying an oil storage tank at a constant rate. The tank started with 2,400 barrels of oil and emptied at a rate of 360 barrels per hour.

1. Write an equation that represents the relationship between B, the number of barrels of oil remaining in the tank and t, the number of hours that the pump has been emptying the tank.

2. How many barrels were in the tank at 5 P.M.? Show the work by which you determined your answer.

3. At what time will the tank be empty? Show how you determined your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

Item B Scoring Rubric—2011 Algebra I

Score	Description
4	The student earns 5 points. Response contains the correct label of "P.M." in Part 3. The response contains no incorrect work.
3	The student earns 3–4½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points or some minimal understanding shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

SOLUTION AND SCORING

Part	Points
1	**1 point possible** 1 point: Correct equation: ***B* = 2400 – 360*t*** **(or equivalent)** **OR** ½ point: Correct expression: **2400 – 360*t***
2	**2 points possible** 1 point: Correct answer: **600** or correct answer based on incorrect equation or expression in Part 1 expressed in terms of *B* and *t* **AND** 1 point: Correct and complete procedure shown and/or explained Work may contain 1 calculation or copy error Give credit for the following or equivalent: • *B* = 2,400 – 360(5) *B* = 2,400 – 1,800 = # or • "After 1 hour, there are 2400 – 360, or 2040 barrels left. After 2 hours, there are 2040 – 360, or 1680 left. After 3 hours, 1680 – 360, or 1320 left. After 4, 1320 – 360, or 960 left. After 5, 960 – 360, or 600 barrels left."

Part	Points
3	**2 points possible** 2 points: Correct answer: **6:40 P.M.** or correct answer based on incorrect equation or expression in Part 1 and Correct and complete procedure shown and/or explained $0 = 2400 - 360t$ $2400 = 360t$ $6\frac{2}{3}$ hrs $= t$ **OR** 1½ points: Correct answer based on rounding to at least two decimal places Ex: 6:40 P.M. $2400 = 360t$ 6.67 hrs $= t$ 6 hrs 40.2 min $= t$ Ex: 6:39:36 P.M. $360t = 2400$ $t = 6.66$ hrs **OR** 1 point: Correct answer: 6:40 P.M. Procedure missing or incomplete or Correct and complete procedure but answer is missing or incorrect due to calculation or copy error Ex: $360t = 2400$ $t = 6\frac{2}{3}$ hrs **OR** ½ point: Incorrect or missing answer due to rounding too soon with some correct work shown Ex: 6:42 P.M. $2400 = 360t$ 6.7 hrs $= t$ .7 hrs = 42 mins or Answer is missing or incorrect due to calculation error with rounding to at least two decimal places

C. A truck driver has a choice of two highways to use for his delivery route. The highway with the least slope will give him the best gas mileage, therefore spending less of his income on gas.

1. The first highway, Highway A, rises 633.6 feet over 10,560 feet of length. What is the slope of Highway A in simplest fraction form?

2. The second highway, Highway B, rises 475.2 feet over 5,280 feet of length. What is the slope of Highway B in simplest fraction form?

3. Which highway should the truck driver use to save money on gas? Justify your answer.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

Item C Scoring Rubric—2011 Algebra I

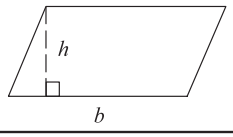
Score	Description
4	The student earns 4 points. The response contains no incorrect work
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point or some minimal understanding shown.
0	The student earns 0 points. No understanding is shown Ex: Both slopes are correct, but neither is in simplest form Ex: Procedure for finding both slopes is correct, but each contains a calculation error
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

SOLUTION AND SCORING

Part	Points
1	**1 point possible** 1 point: Correct answer: $\frac{3}{50}$ **Note: Work is not required**
2	**1 point possible** 1 point: Correct answer: $\frac{9}{100}$ **Note: Work is not required**
3	**2 points possible** **Note: Do not give any credit in Part 3 if answer is correct, but there is no correct procedure in Parts 1 and/or 2.** 2 points: Correct answer of "Highway A" (or correct answer based on incorrect slope(s) in Parts 1 and/or 2, using correct procedure) with correct and complete explanation. Answer must be based on Parts 1 and 2. Give credit for the following or equivalent: • "It's Highway A because $\frac{3}{50}$ is less than $\frac{9}{100}$." or • "Highway A is cheaper since .06 < .09." or • "A because its slope is less that B's slope." **or** 1 point: Give credit for the following or equivalent: • Answer is correct, but explanation is incomplete or vague, but not incorrect: Ex: "Highway A because it's less." or • Answer is missing, but comparison is correct and complete Ex: "$\frac{3}{50} < \frac{9}{100}$" **Note: Do not give any credit if answer is incorrect** **Note: Do not give any credit if answer is correct with incorrect or missing explanation**

End-of-Course Mathematics Reference Sheet

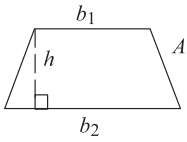
Parallelogram



P = sum of all sides

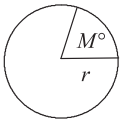
$A = bh$

Trapezoid



$A = \frac{h(b_1 + b_2)}{2}$

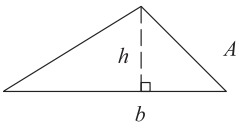
Arc and Sector



Arc Length = $\left(\frac{M}{360}\right) \times 2\pi r$

Sector area = $\left(\frac{M}{360}\right) \times \pi r^2$

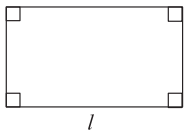
Triangle



P = sum of all sides

$A = \frac{bh}{2}$

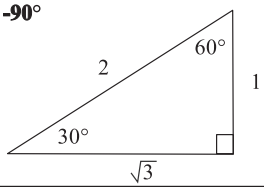
Rectangle



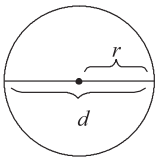
$P = 2l + 2w$

$A = l\,w$

30° -60° -90°



Circle



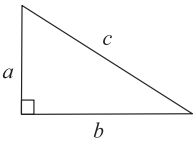
$C = 2\pi r$

$C = \pi d$

$A = \pi r^2$

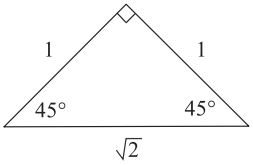
$\pi \approx 3.14$

Pythagorean Theorem

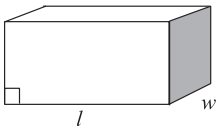


$a^2 + b^2 = c^2$

45° -45° -90°



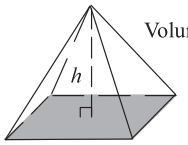
Rectangular Solid



Volume = lwh

Surface area = $2lw + 2lh + 2wh$

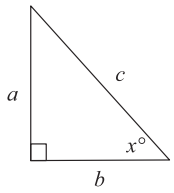
Pyramid



B = *area of base (shaded)*

Volume = $\frac{Bh}{3}$

Trigonometric Ratios

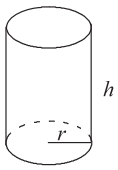


$\sin x° = \frac{a}{c}$

$\cos x° = \frac{b}{c}$

$\tan x° = \frac{a}{b}$

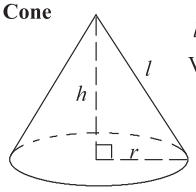
Cylinder



Volume = $\pi r^2 h$

Surface area = $2\pi rh + 2\pi r^2$

Cone

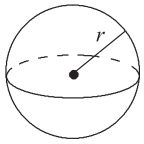


l = slant height

Volume = $\frac{\pi r^2 h}{3}$

Surface area = $\pi rl + \pi r^2$

Sphere



Volume = $\frac{4\pi r^3}{3}$

Surface area = $4\pi r^2$

Miscellaneous Formulas

Area of an equilateral triangle	$A = \frac{s^2\sqrt{3}}{4}$ s = length of a side
Distance	rate × time
Interest	principal × rate × time in years
Sum of the angles of a polygon having n sides	$(n-2)180°$
Distance between points on a coordinate plane	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Midpoint	$\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$
Slope of a nonvertical line (where $x_2 \neq x_1$)	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Slope intercept (where m = slope, b = intercept)	$y = mx + b$
Last term of an arithmetic series Last term of a geometric series (where $n \geq 1$)	$a_n = a + (n-1)\,d$ $a_n = ar^{n-1}$
Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Area of a square	$A = s^2$
Volume of a cube	$V = s^3$
Area of a regular polygon	$A = \frac{1}{2}ap$ a = apothem, p = perimeter

The Arkansas Algebra I Mathematics Curriculum Framework*

Strands	Content Standards	Student Learning Expectations
1. LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.	1. Evaluate algebraic expressions, including radicals, by applying the order of operations. 2. Translate word phrases and sentences into expressions, equations, and inequalities, and vice versa. 3. Apply the laws of (integral) exponents and roots. 4. Solve problems involving scientific notation, including multiplication and division. 5. Perform polynomial operations (addition, subtraction, multiplication) with and without manipulatives. 6. Simplify algebraic fractions by factoring. 7. Recognize when an expression is undefined. 8. Simplify radical expressions such as $\frac{3}{\sqrt{7}}$. 9. Add, subtract, and multiply simple radical expressions like $3\sqrt{20} + 7\sqrt{5}$ and $4\sqrt{5} \bullet 2\sqrt{3}$.
2. SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.	1. Solve multi-step equations and inequalities with rational coefficients • numerically (from a table or guess and check) • algebraically (including the use of manipulatives) • graphically • technologically 2. Solve systems of two linear equations • numerically (from a table or guess and check) • algebraically (including the use of manipulatives) • graphically • technologically 3. Solve linear formulas and literal equations for a specified variable (Ex. Solve for p in I = prt.) 4. Solve and graph simple absolute value equations and inequalities. Ex. $\lvert x \rvert = 5$, $\lvert x \rvert \leq 5$, $\lvert x \rvert > 5$ 5. Solve real-world problems that involve a combination of rates, proportions, and percents. 6. Solve problems involving direct variation and indirect (inverse) variation to model rates of change. 7. Use coordinate geometry to represent and/or solve problems (midpoint, length of a line segment, and Pythagorean Theorem). 8. Communicate real-world problems graphically, algebraically, numerically, and verbally.

*The Content Standards and Student Learning Expectations listed are those that specifically relate to the items in the *2011 Mid-Year, Spring, and Retest End-of-Course Algebra I Examinations.*

The Arkansas Algebra I Mathematics Curriculum Framework*

Strands	Content Standards	Student Learning Expectations
3. LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.	1. Distinguish between functions and nonfunctions/relations by inspecting graphs, ordered pairs, mapping diagrams, and/or tables of data. 2. Determine domain and range of a relation from an algebraic expression, graphs, set of ordered pairs, or table of data. 3. Know and/or use function notation, including evaluating functions for given values in their domain. 4. Identify independent variables and dependent variables in various representational modes: words, symbols, and/or graphs. 5. Interpret the rate of change/slope and intercepts within the context of everyday life. Ex. telephone charges based on base rate (*y*-intercept) plus rate per minute (slope) 6. Calculate the slope given. • two points • the graph of a line • the equation of a line 7. Determine by using slope whether a pair of lines are parallel, perpendicular, or neither. 8. Write an equation in slope-intercept, point-slope, and standard forms, given • two points • a point and *y*-intercept • *x*-intercept and *y*-intercept • a point and slope • a table of data • the graph of a line 9. Describe the effects of parameter changes, slope, and/or *y*-intercepts, on graphs of linear functions and vice versa.
4. NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.	1. Factor polynomials. • greatest common factor • binomials (difference of squares) • trinomials 2. Determine minimum, maximum, vertex, and zeros, given the graph. 3. Solve quadratic equations using the appropriate methods with and without technology. • factoring • quadratic formula with real-number solutions 4. Recognize function families and their connections, including vertical shift and reflection over the *x*-axis. • quadratics (with rational coefficients) • absolute value • exponential functions 5. Communicate real-world problems graphically, algebraically, numerically, and verbally.

*The Content Standards and Student Learning Expectations listed are those that specifically relate to the items in the *2011 Mid-Year, Spring, and Retest End-of-Course Algebra I Examinations*.

The Arkansas Algebra I Mathematics Curriculum Framework*

Strands	Content Standards	Student Learning Expectations
5. DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.	1. Construct and use scatterplots and line of best fit to make inferences in real-life situations. 2. Use simple matrices in addition, subtraction, and scalar multiplication. 3. Construct simple matrices for real-life situations. 4. Determine the effects of changes in the data set on the measures of central tendency. 5. Use two or more graphs (i.e., box-and-whisker, histograms, scatter plots) to compare data. 6. Construct and interpret a cumulative frequency histogram in real-life situations. 7. Recognize linear functions and non-linear functions by using a table or a graph. 8. Compute simple probability with and without replacement. 9. Recognize patterns using explicitly defined and recursively defined linear functions. 10. Communicate real-world problems graphically, algebraically, numerically, and verbally. 11. Explain how sampling methods, bias, and phrasing of questions in data collection impact the conclusions. 12. Recognize when arguments based on data confuse correlation with causation.

*The Content Standards and Student Learning Expectations listed are those that specifically relate to the items in the *2011 Mid-Year, Spring, and Retest End-of-Course Algebra I Examinations.*

PART IV Item Correlation with Curriculum Framework

Mid-Year Released Algebra I Items*

Strands	Content Standards
1— Language of Algebra (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— Solving Equations and Inequalities (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— Linear Functions (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— Non-linear Functions (NLF)	4. Students will compare the properties in the family of functions.
5— Data Interpretation and Probability (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
1	SEI	2	8
2	LA	1	8
3	SEI	2	1
4	LF	3	4
5	NLF	4	1
6	DIP	5	6
7	LA	1	2
8	LF	3	6
9	SEI	2	7
10	NLF	4	3
11	SEI	2	3
12	LA	1	7
13	NLF	4	5
14	DIP	5	2
15	LF	3	2
16	DIP	5	4
17	LF	3	5
18	LA	1	1
19	SEI	2	4
20	LA	1	4
21	DIP	5	8
22	LF	3	8
23	LA	1	5
24	NLF	4	4
25	SEI	2	5
26	LF	3	7
27	NLF	4	3
28	DIP	5	7
29	NLF	4	2
30	DIP	5	11
A	NLF	4	5
B	SEI	2	8

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

PART IV ITEM CORRELATION WITH CURRICULUM FRAMEWORK

Spring Released Algebra I Items*

Strands	Content Standards
1— LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.
5— DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
1	LF	3	1
2	SEI	2	6
3	LF	3	3
4	DIP	5	11
5	SEI	2	4
6	NLF	4	1
7	LA	1	1
8	LA	1	5
9	NLF	4	5
10	DIP	5	1
11	SEI	2	3
12	NLF	4	4
13	SEI	2	2
14	LA	1	3
15	DIP	5	8
16	NLF	4	3
17	LF	3	6
18	NLF	4	2
19	DIP	5	9
20	LF	3	9
21	DIP	5	5
22	LA	1	2
23	LF	3	4
24	NLF	4	4
25	DIP	5	3
26	SEI	2	5
27	LA	1	6
28	SEI	2	1
29	LA	1	9
30	LF	3	7
A	LA	1	5
B	DIP	5	3
C	LF	3	5

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

PART IV ITEM CORRELATION WITH CURRICULUM FRAMEWORK

Retest Released Algebra I Items*

Strands	Content Standards
1— LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.
5— DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
1	LA	1	4
2	SEI	2	6
3	NLF	4	4
4	SEI	2	2
5	LF	3	9
6	LA	1	7
7	NLF	4	2
8	LF	3	8
9	DIP	5	2
10	LA	1	9
11	NLF	4	1
12	DIP	5	6
13	LA	1	8
14	DIP	5	4
15	SEI	2	1
16	LF	3	2
17	LF	3	5
18	NLF	4	2
19	NLF	4	3
20	LF	3	1
21	DIP	5	9
22	LA	1	3
23	SEI	2	8
24	DIP	5	10
25	SEI	2	4
26	LA	1	6
27	LF	3	3
28	NLF	4	5
29	SEI	2	7
30	DIP	5	12

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

continued on next page

Retest Released Algebra I Items* (continued)

Strands	Content Standards
1— Language of Algebra (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— Solving Equations and Inequalities (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— Linear Functions (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— Non-linear Functions (NLF)	4. Students will compare the properties in the family of functions.
5— Data Interpretation and Probability (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
31	LF	3	7
32	NLF	4	1
33	SEI	2	6
34	DIP	5	10
35	LA	1	2
36	DIP	5	1
37	LF	3	4
38	LA	1	5
39	DIP	5	12
40	LA	1	6
41	NLF	4	5
42	SEI	2	2
43	LF	3	3
44	LA	1	1
45	SEI	2	7
46	NLF	4	3
47	SEI	2	5
48	LF	3	1
49	LA	1	3
50	NLF	4	4
51	LF	3	2
52	DIP	5	9
53	LF	3	8
54	DIP	5	5
55	NLF	4	2
56	SEI	2	3
57	LA	1	9
58	NLF	4	1
59	SEI	2	8
60	DIP	5	7
A	LF	3	6
B	NLF	4	1
C	SEI	2	5

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

PART IV ITEM CORRELATION WITH CURRICULUM FRAMEWORK

Mid-Year Non-Released Algebra I Items*

Strands	Content Standards
1— LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.
5— DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
1	DIP	5	9
2	LF	3	3
3	NLF	4	5
4	DIP	5	1
5	LA	1	6
6	NLF	4	1
7	LA	1	5
8	LF	3	1
9	DIP	5	3
10	LF	3	5
11	SEI	2	5
12	DIP	5	10
13	LA	1	1
14	NLF	4	3
15	LF	3	9
16	SEI	2	4
17	SEI	2	6
18	NLF	4	4
19	LA	1	3
20	NLF	4	2
21	LA	1	2
22	SEI	2	7
23	NLF	4	1
24	LF	3	6
25	SEI	2	2
26	DIP	5	12
27	DIP	5	5
28	LF	3	4
29	SEI	2	1
30	LA	1	9
A	LA	1	1
B	DIP	5	3
C	LF	3	5

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

PART IV ITEM CORRELATION WITH CURRICULUM FRAMEWORK

Spring Non-Released Algebra I Items*

Strands	Content Standards
1— LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.
5— DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
1	LA	1	2
2	NLF	4	3
3	LF	3	8
4	LF	3	6
5	DIP	5	7
6	SEI	2	1
7	LA	1	7
8	DIP	5	4
9	NLF	4	2
10	LA	1	1
11	DIP	5	6
12	NLF	4	1
13	LF	3	8
14	SEI	2	3
15	LA	1	5
16	LF	3	2
17	SEI	2	7
18	DIP	5	10
19	SEI	2	5
20	DIP	5	2
21	NLF	4	4
22	LA	1	8
23	LF	3	5
24	SEI	2	4
25	LF	3	3
26	LA	1	4
27	NLF	4	3
28	SEI	2	8
29	NLF	4	1
30	DIP	5	12
A	SEI	2	8
B	NLF	4	5

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

PART IV ITEM CORRELATION WITH CURRICULUM FRAMEWORK

Retest Non-Released Algebra I Items*

Strands	Content Standards
1— LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.
5— DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
1	DIP	5	7
2	LF	3	3
3	LA	1	1
4	LF	3	6
5	SEI	2	1
6	DIP	5	3
7	NLF	4	3
8	LA	1	5
9	SEI	2	3
10	LA	1	2
11	SEI	2	6
12	LF	3	9
13	NLF	4	2
14	DIP	5	1
15	DIP	5	5
16	LA	1	4
17	SEI	2	5
18	LF	3	5
19	DIP	5	8
20	LA	1	5
21	SEI	2	8
22	LF	3	7
23	NLF	4	4
24	LF	3	4
25	SEI	2	4
26	NLF	4	4
27	LA	1	1
28	NLF	4	1
29	DIP	5	11
30	NLF	4	5

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

continued on next page

PART IV ITEM CORRELATION WITH CURRICULUM FRAMEWORK

Retest Non-Released Algebra I Items* (continued)

Strands	Content Standards
1— LANGUAGE OF ALGEBRA (LA)	1. Students will develop the language of algebra including specialized vocabulary, symbols, and operations.
2— SOLVING EQUATIONS AND INEQUALITIES (SEI)	2. Students will write, with and without appropriate technology, equivalent forms of equations, inequalities, and systems of equations, and solve with fluency.
3— LINEAR FUNCTIONS (LF)	3. Students will analyze functions by investigating rates of change, intercepts, and zeros.
4— NON-LINEAR FUNCTIONS (NLF)	4. Students will compare the properties in the family of functions.
5— DATA INTERPRETATION AND PROBABILITY (DIP)	5. Students will compare various methods of reporting data to make inferences or predictions.

Item	Strand	Content Standard	Student Learning Expectation
31	DIP	5	11
32	LA	1	8
33	LF	3	6
34	NLF	4	2
35	SEI	2	1
36	NLF	4	3
37	SEI	2	4
38	LF	3	8
39	DIP	5	6
40	NLF	4	5
41	DIP	5	8
42	LF	3	9
43	LA	1	2
44	DIP	5	4
45	SEI	2	4
46	DIP	5	2
47	LA	1	4
48	NLF	4	1
49	SEI	2	2
50	LA	1	5
51	NLF	4	3
52	SEI	2	5
53	LF	3	3
54	LA	1	7
55	DIP	5	3
56	LF	3	5
57	LF	3	6
58	LA	1	1
59	NLF	4	4
60	SEI	2	1
A	LA	1	1
B	DIP	5	2

*Only the predominant Strand, Content Standard, and Student Learning Expectation are listed for the Algebra I items.

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Arkansas Comprehensive Testing, Assessment, and Accountability Program

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